Knab Masterplan, Lerwick, Shetland **06/06/2019**

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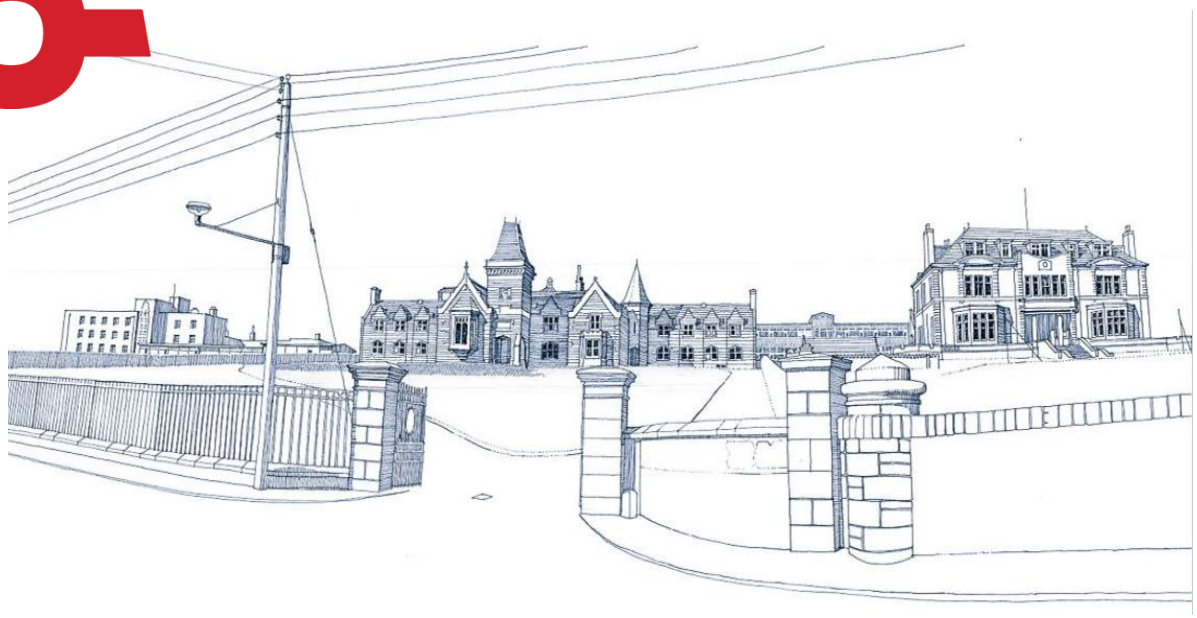
KNAB MASTERPLAN - TRANSPORT FRAMEWORK



Shetland Islands Council

SYSTRA

KNAB MASTERPLAN, LERWICK, SHETLAND

KNAB MASTERPLAN - TRANSPORT FRAMEWORK

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NON-TECHNICAL SUMMARY

This Transport Framework has been prepared to inform the emerging masterplan proposals for the site of the former Anderson High School in Lerwick, Shetland. The masterplan proposal will include a balance of residential, recreational, business and community uses which complements the surrounding area and town centre. The principal aim of this report is to ensure that accessibility to the site by foot, by cycle and by public transport is maximised and that any trips made by car can be accommodated by the existing road network without detriment to existing users.

The development site has good pedestrian links to the town centre (within a 10 – 15 minute walk) and the neighbouring residential areas. The standard of footways in the surrounding area are good and the street signs / road markings are generally well maintained. In order to maximise the potential number of pedestrian trips generated by the masterplan development, it will be designed with multiple pedestrian access points, through routes, green spaces and squares. Delivering a permeable layout will create a welcoming pedestrian environment and will promote low vehicle speeds. Cycle parking will be provided for the other land uses within the masterplan development proposals to support those wishing to cycle.

No additional bus infrastructure is proposed as part of the development proposals at this stage. It is considered that this distance and the level of service provided at this stop is sufficient to serve the proposed masterplan development. Notwithstanding this, a suitable location for a potential new bus stop and bus turning area adjacent to the site has been identified. Discussions would need to be had at an appropriate time with bus operators if this option was to be considered further.

Vehicular access from the local road network to the proposed masterplan development will be provided from four points: three from Gressy Loan and another from Lover's Loan, consistent with the current arrangements for the site. The access arrangement will ensure that traffic associated with the masterplan land uses will ultimately create a similar distribution of traffic along the main roads running adjacent to the development site.

This Transport Framework has assessed the potential impact that the vehicle trips generated by the masterplan development would have on the local road network, specifically, the 4-arm roundabout between Church Road, Greenfield Place, Knab Road and Annsbrae Place.

The results from the junction analysis indicate that the roundabout would continue to operate comfortably within its practical capacity and would have residual capacity during the opening year of the full masterplan development (2026). It is concluded that traffic associated with the full masterplan development can be suitably accommodated by the Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout without causing a detriment to the existing road users. Furthermore, a vehicle trip generation comparison exercise between the former and proposed uses of the site indicates that the proposed masterplan development would have no net detriment to the traffic levels experienced when Anderson High School occupied the site. The level of car parking provision for the masterplan development will be finalised in agreement with SIC.

SYSTRA concludes that the masterplan site is suitable for housing and that the proposals will integrate well into the existing transport network.

1. INTRODUCTION

1.1.1 SYSTRA Ltd (SYSTRA) has been commissioned by Shetland Islands Council (SIC) as part of a multidisciplinary team to provide transport planning advice and input into the development of a masterplan framework for a site in Lerwick. The site is located in the south east peninsula of Lerwick which currently houses the former Anderson High School, student accommodation, the former Shetland College UHI learning centre and the Bruce Family Centre. The location of the site is indicated by **Figure 1.1** below.

Figure 1.1 Site Location

Source: OS Maps & SYSTRA

1.1.2 SIC's vision for the re-development of the site is to create a vibrant, thriving and sustainable mixed use community which is an exemplar for future regeneration projects throughout Shetland and beyond. The masterplan proposal will include a balance of residential, recreational, business and community uses which complements the surrounding area and town centre.

1.2 Planning History of the Site

1.2.1 In 2009, Faber Maunsell (now AECOM) prepared a Transport Assessment (TA) for the masterplan site in relation to replacing the existing Anderson High School building with a new build school on the same site able which would cater for a larger number of pupils (approximately 100 additional pupils).

1.2.2 The conclusion of the 2009 TA was that all junctions assessed in full (Burgh Road / Sletts Road / Scalloway Road priority crossroads, Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout, and Breiwick Road / Knab Road priority junction) would operate within capacity in the opening year without the requirement of any mitigation measures.

1.3 The Report

1.3.1 SYSTRA has been commissioned to prepare a Transport Framework (TF) to support the masterplan development proposals. The TF will follow the guidance and structure of a traditional Transport Assessment in that it the report will assess the accessibility of the site, ensure it can be integrated into the surrounding transport network, and sustainable development principles have been adopted in the preparation of the people trip assessment.

1.3.2 The principal aim is to ensure that accessibility to the site by foot, by cycle and by public transport is maximised and that any trips made by car can be accommodated by the existing road network without detriment to existing users.

1.3.3 An additional exercise has been undertaken in order to understand the anticipated level of people trips that the land uses within the masterplan development could generate. The people trip generation is considered in relation to what proportion of these people trips would manifest as additional vehicle on the local road network and what impact this would have on the local road network. Furthermore, an exercise has been undertaken to consider a comparison in the number and pattern of vehicle trips that Anderson High School generated at the site versus the masterplan proposals.

1.4 Report Structure

1.4.1 Following this introductory chapter, the structure of the report is as follows:

- Chapter 2 – Policy Framework
- Chapter 3 – Appraisal of Existing Situation
- Chapter 4 - Masterplan Proposal Trip Generation
- Chapter 5 – Measures to Support the Masterplan Proposal
- Chapter 6 – Traffic Impact Assessment
- Chapter 7 – Summary and Conclusions

2. POLICY FRAMEWORK

2.1.1 This chapter contains a review of the national, regional and local transport policies and guidance relevant to this project and that have been considered in this report.

2.2 National Policies

***Scottish Planning Policy (SPP),* 2014**

2.2.1 The purpose of the SPP is to provide policy on land use planning and the associated planning process. This document highlights a range of considerations from a transport perspective and is heavily focused towards providing sustainable developments.

2.2.2 There are number of key criteria and elements of SPP that a development should seek to satisfy. These are summarised as follows:

- **Paragraph 15** – Locating the development in the right place can provide opportunities for people to make sustainable choices, improve quality of life and delivering high quality infrastructure and a choice of how to access amenities and services;
- **Paragraph 23** – Align development more closely with transport to improve sustainability and connectivity. This is in relation to 'Planning Outcome 4'[1] of SPP to provide a more connected place supporting better transport (and digital) connectivity;
- **Paragraph 29** – Planning policies and decisions should be guided by a number of principles including supporting delivery of accessible housing, business, retailing and leisure development and, support delivery of infrastructure for example transport;
- **Paragraph 40** – Planning should direct the right development to the right place by optimising the existing resource capacities, principally by co-ordinating housing and business development with infrastructure investment including transport;
- **Paragraph 46** – Developments should be easy to move around and beyond by considering the needs of people before the movement of motor vehicles. This could include higher densities and mix of uses that enhances accessibility by reducing reliance on private cars, prioritising sustainable and active travel choices such as walking, cycling and public transport. This would include paths and routes with direct connections and well connected to the wider area beyond the site boundary. This could include infrastructure and facilities that link different modes of travel;
- **Paragraph 270** – The planning system should support patterns of development that optimises the use of existing infrastructure, reduces the need to travel, provides safe and convenient opportunities for walking and cycling and facilitates travel by public transport and, enables the integration of transport modes;

[1] "A more connected place – supporting better transport and digital connectivity"

- **Paragraph 273** – Promote development which maximises the extent to which travel demands are met first from walking, cycling, public transport and finally car. Plans should facilitate integration between transport modes;
- **Paragraph 279** – Significant travel generation developments should be sited at locations which are well served by public transport and supported by measures to promote the availability of high quality public transport services, that provide access to a range of destinations;
- **Paragraph 281** – When an area is well served by sustainable transport modes, planning authorities may set more restrictive parking standards; and
- **Paragraph 287** – Planning permission should not be granted for significant travel generating developments where there are no direct links to local facilities by walking and cycling, or public transport networks would involve walking more than 400m and no satisfactory measures to meet sustainable transport requirements are brought forward.

***Designing Streets*, 2010**

2.2.3 Designing Streets emphasises the importance of providing well designed streets at the heart of sustainable communities and demonstrates the benefits that can be realised by assigning a higher priority to pedestrians and cyclists from good street design. The document seeks a shift away from a rigid application of design standards to a more holistic approach to the creation of places.

2.2.4 Designing Streets was the first policy statement in Scotland for street design and marked a change in the emphasis of guidance on street design towards place-making and pedestrian movement and away from a system focused upon the dominance of motor vehicles. It has been created to support the Scottish Government's place-making agenda and is intended to sit alongside the 2001 planning policy document Designing Places, which sets out government aspirations for design and the role of the planning system in delivering these.

2.2.5 Designing Streets emphasises that street design should meet the following six qualities of successful places:

- Distinctive
  - Block structure with distinctive landmarks and vistas; and
  - Local context and distinctive character.
- Safe and pleasant
  - Pedestrians and cyclists at the top if the street user hierarchy;
  - Achieving appropriate traffic speeds by design; and
  - Reducing clutter with signs and street markings kept to a minimum.
- Easy to move around
  - Connections within a place by good connectivity for all modes of movement;
  - Public transport planning considered at an early stage; and
  - Junction types and arrangements with the consideration of pedestrians first.

- Welcoming
  - Walkable neighbourhoods; and
  - Streets for people allowing social interaction;
- Adaptable
  - Connection to wider networks providing flexibility and able to accommodate changes;
  - Integrating parking providing flexibility and lessens visual impact; and
  - Service and emergency vehicles should be accommodated by street layouts.
- Resource efficient
  - Orientation of buildings should maximise environmental benefits;
  - Drainage of streets should use SUDS techniques;
  - Utilities should not determine the layout of streets or footways;
  - Planting and natural landscapes should be integrated; and
  - Materials should be distinctive, easily maintained and durable.

Planning Advice Note (PAN) 75 "Planning for Transport", 2005

2.2.6 PAN 75 accompanies SPP with an aim to create greater awareness of the link between planning and transport and how it can be managed, highlighting the role of different bodies and professions. PAN 75 provides a good practice guide for planning authorities and developers in relation to carrying out policy development, proposal assessment, and project delivery. Paragraphs 7 and 24 of PAN 75 respectively highlight the following:

> *"The intention is for new developments to be user focused and for the transport element to promote genuine choice, so that each mode contributes its full potential and people can move easily between different modes. Consideration should be given to freight logistics as well as person travel."*
>
> *"Development plan policy should encourage development of significant travel generating proposals at locations which are key nodes on the public transport network that have a potential for higher density development and a potential for mixed use development with an emphasis on high quality design and innovation. These locations should encourage modal shift of people and freight by providing good linkages to rail, walking and cycling networks and with vehicular considerations, including parking, having a less significant role. Mixed use development, for example the inclusion of local shops and services within larger housing developments can encourage multipurpose trips and reduce overall distances travelled by car by bringing together related land uses."*

2.2.7 PAN 75 also states that as good practice, developments should be within 400m walking distance from a bus service, 800m walking distance from a rail service and 1600m walking distance from local services and amenities.

2.3 Regional and Local Policies

***Shetland Local Development Plan* (SLDP), adopted in September 2014**

2.3.1 The SLDP seeks to ensure that future development takes place in a sustainable way with the implementation of new footpaths and cycle ways in and around settlements. The encouragement of safe links between residential areas, public transport and community services will aid to build sustainable, healthy communities. The Knab site has been identified as a '*Site with Development Potential*' within the SLDP and is earmarked for mixed use.

2.3.2 The plan includes a number of transport policies that directly affect the Knab Masterplan proposal which are as follows:

- *TRANS 1 Integrated Transport*

2.3.3 Policy TRANS 1 seeks to support sustainable economic growth and improve access to jobs and training, improve social inclusion and well-being and develop healthy communities. The most relevant themes are identified below:

- Maintain an appropriate level of accessibility by every mode with the aim of sustaining and developing the economy of the island;
- Support the provision and improvement of public transport services;
- Encourage awareness of travel choices to limit traffic growth;
- Improve public transport corridors, promote innovative and flexible public transport usage;
- Develop facilities for walking and cycling;
- Assist in improving path networks; and
- Improve and enhance access to Lerwick town centre by all forms of transport.

- *TRANS 3 Access and Parking Standards*

2.3.4 Policy TRANS 3 seeks to support the creation of safe and successful places. The policy states that all developments should provide:

- A safe and adequate access, visibility splay and turning area in accordance with the standards in the Residential Access Guidance (Supplementary Guidance); and
- Appropriate car parking and service facilities in accordance with SIC's current parking standards guidance.

Shetland Islands Council *"Our Plan, 2016 to 2020"*

2.3.5 The SIC Corporate Plan focuses on the ever changing working environment to address three challenges that affect the way SIC work as an organisation which are:

- Money – a reduction in the funding SIC receive from the Government;
- The local economy; and
- The population.

2.3.6 The Corporate Plan highlights seven transport related outcomes that SIC will work towards by 2020 to improve connections and access for the population of the Shetland Islands. These outcomes include:

- Creating transport arrangements that meet people's needs and SIC can afford to maintain;
- Introducing efficient and effecting booking and paying systems for buses and ferries;
- Making ferry and air services more affordable for those on lower incomes;
- Create better connected communities through new community transport solutions developed by the communities themselves;
- Have a clearer understanding of the options and investment needed to create a sustainable internal transport system over the next 50 years; and
- Create a programme of potential changes to external transport systems to meet the economic-growth needs of the Shetland Islands.

Shetland Partnership *"Local Outcomes Improvement Plan" (LOIP)*, June 2016

2.3.7 Shetland Partnership's LOIP sets out the activities to deliver the Shetland Community Plan and describes the priorities that have been identified to have the greatest benefit to Shetland and how these will be delivered. In relation to transport and the Knab Masterplan, the following outcome applies:

- **Outcome D**: Shetland has sustainable growth and all our people have the chance to the part of island life.
  - **D1**: Attracting more people to Shetland to live, work, study and invest.
    - **D1.3**: Develop and deliver a refreshed Transport Strategy, supporting Shetland Partnership Board's ambition, where feasible, to attract more people to live, work, study and invest in Shetland.

2.3.8 Principles in Shetland's current Transport Strategy (2008) provided by the Shetland Transport Partnership (ZetTrans) are detailed below.

***Shetland Transport Strategy*, 2008**

2.3.9 ZetTrans was established following the introduction of the Transport (Scotland) Act 2005. The Shetland Transport Strategy is a statutory document and is supported by an accompanying Delivery Plan document which outlines the specific interventions that ZetTrans will implement to meet the objectives of the Strategy.

2.3.10 The document outlines a number of key issues which shape the strategy. Those related to the Knab Masterplan proposal are outlined below.

- *Health and Transport – Core Paths Plan*

2.3.11 In order to increase the attractiveness of the walking, ZetTrans supports and encourages the development of the Council's first Core Paths Plan. Core Paths in Shetland are for all type of users including walkers, cyclist and people with disabilities with the purpose of:

- Supporting healthy lifestyles and health improvement initiatives;

- Encourage waking and cycling as sustainable transport modes for everyday;
- Contribute to social inclusion and community safety; and
- Encourage economic development.

2.3.12 In addition to Shetland's Core Paths Plan, ZetTrans propose an audit of footway schemes focusing on:

- Improvements to existing paths (drop kerbs and tactile paving);
- Identification of potential new locations for new links – Provide safe and attractive local pedestrian networks; and
- Traffic calming initiatives in order to improve road safety.

- *Cycling*

2.3.13 ZetTrans is committed to increasing levels of cycling throughout Shetland in collaboration with SIC as cycling levels in Shetland are currently perceived to be low, with the topography, weather, and relatively long distances between destinations suppressing this activity. ZetTrans and SIC are seeking to implement cycle facilities and infrastructure. Hence,

- ZetTrans will undertake an audit of potential cycle opportunities in the island;
- Promote cycling through the provision of secure cycle stands at key locations;
- Encouraging the inclusion of cycling facilities;
- Cycling training in all schools; and
- Continued promotion and maintenance of the national cycle network.

- *Parking Policy*

2.3.14 The Shetland Transport Strategy is aware that there are few parking issues in Shetland compared to urban centres. SIC aim to ensure that developments include parking and servicing facilities on-site, however, the policy states that:

> *"The use of parking controls and the adoption of maximum car parking standards as a demand management tool to influence road traffic is subsequently not considered appropriate in the Shetland context where public transport is often limited and there is a heavy reliance on the private car. It is also believed that applying formal standards in rural areas is likely to have a detrimental impact on the environment."*
>
> *"For the purposes of this Transport Strategy, ZetTrans will continue to support the adoption of the general car parking standards set out in the Shetland Local Plan. ZetTrans will continue to consider ways of reducing the need for car parking through improved public transport and encouraging the development of Travel Plans. However, it is recognised that car use will remain a necessity for the majority of Shetland residents."*

Shetland, Orkney and Comhairle nan Eilean Siar *"Our Islands, Our Future"*, 2014

2.3.15 Scotland's three Islands Councils have agreed to work together in a programme of positive engagement to ensure that the position and needs of the islands are acknowledged and recognised in Scotland's Constitution. The paper sets out the general principles which the Island's Councils hope will be examined in the course of the debate on Scotland's Constitution. In relation to transport, these are:

- Sustainable transport: effective transport links to maximise Island resources, and effective engagement with the EU to seek appropriate targeting of structural fund assistance.

***Knab Masterplan Development Brief*, 2017**

2.3.16 The project Development Brief is non-statutory Supplementary Guidance to the Local Development Plan and was approved by SIC November 2016. The Development Brief will form a material consideration to any planning application submitted relating to the redevelopment of the site.

2.3.17 SIC undertook a consultation across Shetland using the Place Standard Tool to establish people's views about their area across 14 the following 14 themes:

- Moving around;
- Public transport;
- Traffic and parking;
- Streets and spaces;
- Natural space;
- Play and recreation;
- Facilities and amenities;
- Work and local economy;
- Housing and community;
- Social interaction;
- Identifying and belonging;
- Feeling safe;
- Care and maintenance; and
- Influence and sense of control.

2.3.18 The result indicate that for the people living in Lerwick and Bressay, housing and community was voted as the highest priority. Second was work and local economy while public transport was voted as the third highest priority. These results have been used to inform the design principles of the Development Brief and with regard to transport, the Brief states that Knab Masterplan should create a place:

- That considers the needs of people before motor vehicles;
- Where active travel choices such as cycling, walking and public transport should be promoted;

- Where paths and routes should be developed within the site which connect those living and working within the area not only to other parts of the development, but to areas outwith the site and beyond. In particular good connections to the Knab recreational area and Lerwick Town Centre and to public transport are essential;
- That provides spaces that are easy to move around and promote good accessibility; and
- That includes landmarks and vistas to help people navigate the area.

2.3.19 The Development Brief also indicates potential options / preferred outcomes of development on the Knab site in relation to traffic and transport:

- There is an option to create a new access on the west of the site onto Knab Road to increase traffic flow through the site and lead to a reduction in the use of the other access points;
- It would be undesirable to see an increase in traffic at the Twageos Road access point;
- It would be desirable to see a decrease in traffic using Lover's Loan / Breiwick Road Junction; and
- There will be no change to service bus routes in and around the site.

SIC Transport Planning

2.3.20 Consultation was undertaken with SIC Transport Planning department (Executive Manager) at this stage to understand their general views and initial thoughts of the Knab site with regard to traffic and transport.

2.3.21 SIC Transport Planning's key point is that active travel (walking and cycling) and public transport considerations should be integral in the developing options for the Knab site. They comment that sustainable travel options should develop and evolve with the emerging ideas for the site and that the Knab site presents a great opportunity for creating an exemplar site in Lerwick and the Shetlands in terms of integrated active travel and public transport.

2.3.22 With regard to the local road network, SIC Transport Planning notes that some queuing can be experienced at junctions during the school peak AM and PM periods, however, there are no fundamental capacity issues. Furthermore, as Anderson High School is moving from the Knab Site to the new site adjacent to Clickimin, this traffic will be removed from the immediate vicinity of the Knab site. The only potential "pinch point" is the Knab Road / Church Road / Annsbrae Place / Greenfield Place Roundabout which has physical constraints in terms of its size and inability to be expanded due to being "boxed-in" by the surrounding buildings.

2.4 Summary

2.4.1 The principles in the aforementioned policies and guidance documents are focused upon a hierarchical approach with regard to supporting and facilitating methods of travel. Sustainable modes such as walking and cycling form the top tier of the hierarchy while car use is the bottom.

2.4.2 These principles, including the preferred options / outcomes outlined within the Development Brief and the key points raised by SIC Transport Planning, will be carried through the ongoing development of the masterplan and inform the final transport framework for the site.

2.4.3 The final transport framework will seek to demonstrate how the Knab development will accord and be aligned with the various principles outlined within these policy and guidance documents.

3. APPRAISAL OF EXISTING SITUATION

3.1.1 As indicated in the introduction of this report, this site appraisal chapter is informed by a site visit undertaken by SYSTRA on 8th and 9th August 2017. The site visit comprised an appraisal of the following:

- The existing vehicular and pedestrian access points to the site;
- The pedestrian and cycle infrastructure through and surrounding the site;
- The public transport facilities in the vicinity of the site;
- The local road network; and
- The standard of the route between the site and the town centre.

3.1.2 The following paragraphs detail the existing conditions within and surrounding the development site.

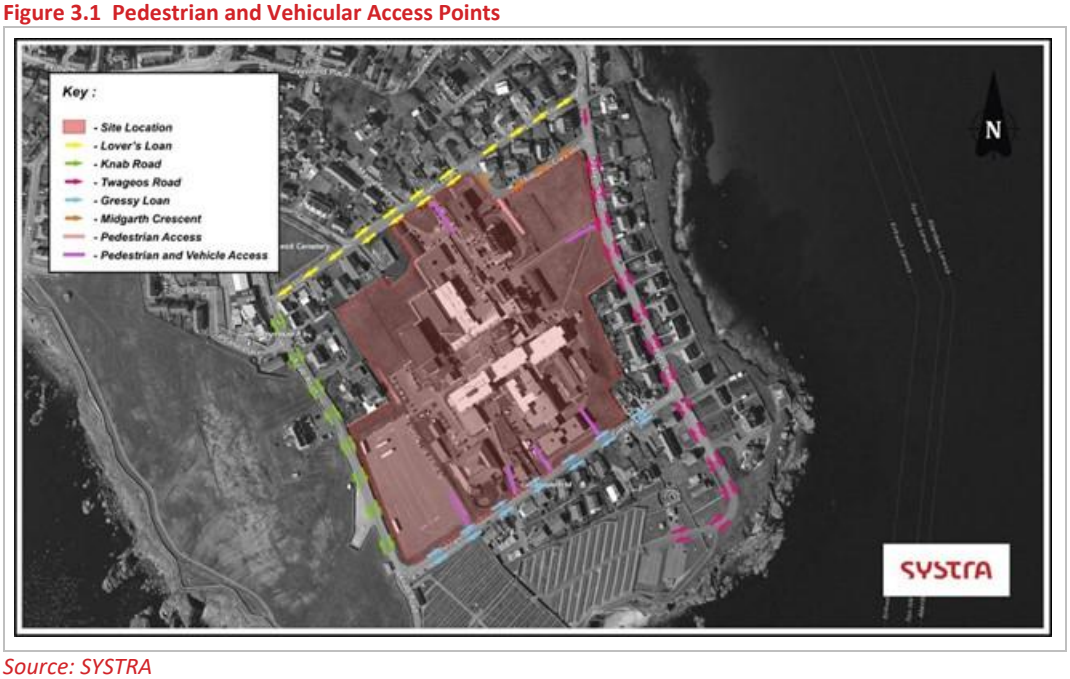
3.2 Current Use

3.2.1 The development site is 69,900sqm (6.99 hectares) and comprises Anderson High School as the primary land use, including Janet Courtney halls of residence which are boarding facilities for students of the High School from the out-lying Shetland Isles. Anderson High School has moved to a new site to the north-west of Lerwick adjacent to Clickimin Leisure Complex.

3.3 Access Points

3.3.1 The overall development site is bound to the north by Lovers Loan and Midgarth Crescent, to the east by Twageos Road, to the south by Gressy Loan and to the east by Knab Road. There are multiple vehicular and pedestrian access points which are indicated by **Figure 3.1** and detailed in this section.

Figure 3.1 Pedestrian and Vehicular Access Points



Source: SYSTRA

Vehicular Access

3.3.2 There are multiple existing vehicular access points to the site and to Anderson High School as there are various different buildings / departments. Access to one of the main car parks for the High School is from Lovers Loan where there is a one-way system offering a small number of parking spaces and also providing access to a larger car park further into the site. **Figure 3.2** indicates the one-way system while **Figure 3.3** indicates the access point to the car park provided from the one-way route.

Figure 3.2 One-way Access Road

Source: SYSTRA

Figure 3.3 Access to Larger Car Park Within Site

Source: SYSTRA

3.3.3 Direct vehicular access to the main building of the High School is provided through a set of gates from Twageos Road to the east of the site, as indicated by **Figure 3.4**.

Figure 3.4 Vehicular Access to Main Building

Source: SYSTRA

3.3.4 All areas of the site are accessible from one another via pedestrian routes but further vehicular access points are provided on the southern side of the site from Gressy Loan, one of which provides access to the Janet Courtney halls of residence, as indicated by **Figure 3.5**. There is a vehicular access on the west of Janet Courtney halls which provides access to a car parking area, albeit there are no marked parking bays. This access is indicated in **Figure 3.6**.

Figure 3.5 Vehicular Access to Janet Courtney Halls of Residence

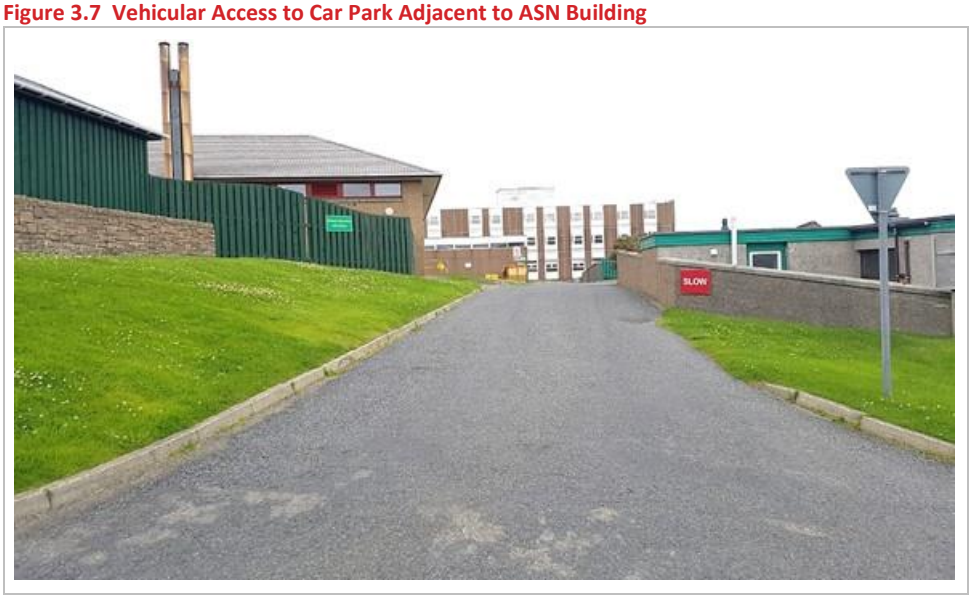
Source: SYSTRA

Figure 3.6 Vehicular Access to Car Parking Area from Gressy Loan

Source: SYSTRA

3.3.5 There is a third vehicular access from Gressy Loan adjacent to the Anderson High School Additional Support Needs (ASN) department, which links to a larger car park located behind the High School buildings. The access point is indicated in **Figure 3.7** while an internal view of the car park is indicated by **Figure 3.8**.

Figure 3.7 Vehicular Access to Car Park Adjacent to ASN Building



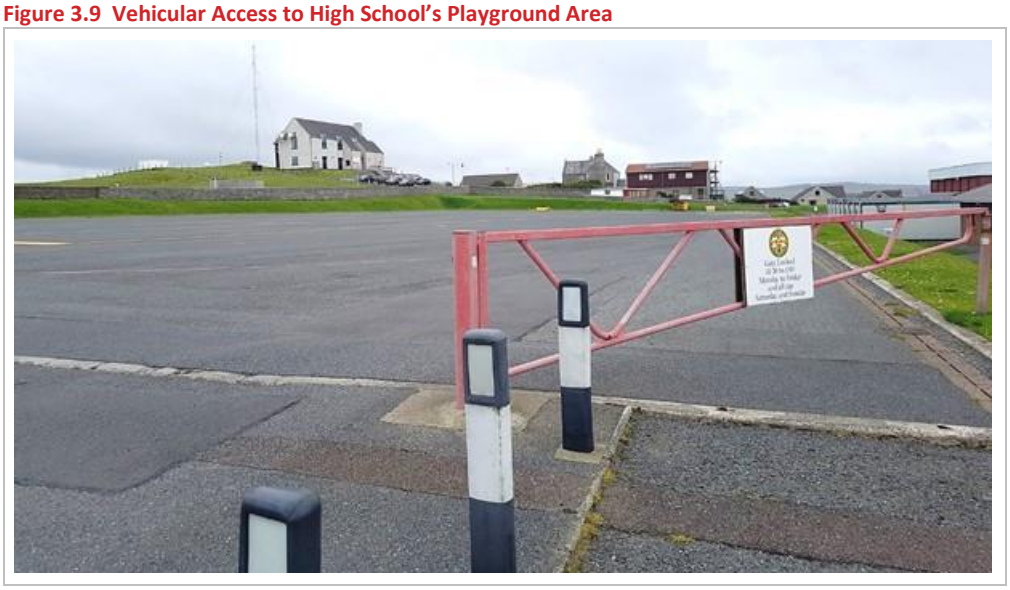
Source: SYSTRA

Figure 3.8 Internal Car Park behind High School Buildings

Source: SYSTRA

3.3.6 Anderson High School also has a hardstanding playground area within the site at the south-western corner which has a gated vehicular access and is understood to be used for occasional parking. This access is indicated by **Figure 3.9**.

Figure 3.9 Vehicular Access to High School's Playground Area



Source: SYSTRA

3.3.7 In summary, the site has a total of six vehicular access points and there are several car parking areas within the site for the use by the various land uses within the site.

Pedestrian Access

3.3.8 Pedestrian access to the site is achievable via each of the six vehicular access points and there is good permeability through the site for pedestrians. The only additional access from the local road network which is solely for pedestrians is from Midgarth Crescent as indicated by **Figure 3.10** below. It is noted that this is a stepped access, therefore not suitable for the mobility impaired, however, the aforementioned vehicular access points are better suited.

Figure 3.10 Pedestrian Access from Midgarth Crescent

Source: SYSTRA

3.3.9 Throughout the site there are pedestrian routes which weave between the buildings, some of which are offer steps and / or ramps given the varying gradients within the site. An example of this is indicated by **Figure 3.11**.

Figure 3.11 Ramped Pedestrian Route Through Site

Source: SYSTRA

3.4 Walking Accessibility

General

3.4.1 Core Paths Plans were introduced by Part 1 of the Land Reform (Scotland) Act 2003 and there is a network of core paths around Lerwick and in proximity to the site. The paths vary in type from natural ground to constructed paths and cater for all non-car uses such as walking, cycling and horse riding. The core path network in relation to the site is indicated by **Figure 3.12**.

Figure 3.12 Core Path Network

Source: Bing Maps & SYSTRA

3.4.2 It was observed during the site visit that the gradient at the site and throughout Lerwick is variable and there are some long inclines which may be challenging for some pedestrians. The eastern side of the site is at a considerably lower level compared to the western side. Similarly, Lerwick Town Centre is close to sea level while moving eastwards into the residential areas of Lerwick involves a steep incline.

Pedestrian Crossings

3.4.3 There are several pedestrian crossing opportunities around the site and within Lerwick. These crossings are a variety of dropped kerbs and controlled crossings such as signalised and zebra crossings with tactile paving. The location of pedestrian crossing opportunities in Lerwick are indicated by **Figure 3.13**.

Figure 3.13 Pedestrian Crossing Opportunities

Source: Bing Maps & SYSTRA

Locally

3.4.4 There is a well-established network of footways in the surrounding area that are generally of a good standard and on at least one side of the road. Street lighting is also provided throughout. The general characteristics of the footways in the vicinity of the site are indicated by **Figure 3.14** on Midgarth road. However, there are points where the footways are constricted in terms of width such as where Midgarth Road meets Lover's Loan as indicated by **Figure 3.15**.

Figure 3.14 General Characteristics of Footways Surrounding the Site

Source: SYSTRA

Figure 3.15 Example Restricted Width Footway

Source: SYSTRA

Town Centre

3.4.5 Lerwick Town Centre is approximately a 10 – 15 minute walking distance[2] from the site and is accessible by two routes via Knab Road or Twageos Road.

3.4.6 Commercial Street is a paved shared space for pedestrians, cyclists and vehicles. For pedestrians, Commercial Street continues from Twageos Road to the town centre, cutting across the A969 and is the main shopping high street within Lerwick. Commercial Street to the west of the A969 permits one-way traffic and the general characteristics are indicated by **Figure 3.16**.

Figure 3.16 General Characteristics of Commercial Street East of A969

Source: SYSTRA

[2] Assuming a walking speed of 1.4m/s as per Google Maps journey times

3.4.7 There is a zebra crossing on the A969 provided to continue the pedestrian link along Commercial Street. Through-traffic is not permitted along Commercial Street to the west of the A969 unless for access to the properties or retail units. These features are indicated by **Figure 3.17**.

Figure 3.17 Zebra Crossing on A969

Source: SYSTRA

3.5 Cycling Accessibility

3.5.1 There are no formal on-road or off-road provisions for cyclists in Lerwick such as designated cycle lanes, however, the National Cycle Network Route (NCR) 1 follows the A969 into Lerwick and along King Herald Street to re-join the A969 at the junction with North Road / Commercial Road.

3.5.2 In general, the roads surrounding the site are conducive to cycling in that they are good standard residential roads which are lightly trafficked and have traffic calming measures in place (in the form of speed cushions and 20mph speed restrictions in sections). However, it is noted that variable gradient throughout the site and Lerwick as a whole could be a barrier to cycling for some.

3.5.3 An example of the traffic calming measures that are in place on Knab Road are indicated in **Figure 3.18**.

Figure 3.18 Traffic Calming Measures on Knab Road

Source: SYSTRA

3.6 Public Transport

Bus

3.6.1 The nearest existing bus stop to the site is located on Annsbrae Place near the Knab Road / Church Road / Greenfield Place / Annsbrae Place Roundabout which is approximately 850m from the furthest away point of the site and 450m from the centre of the site. This bus stop includes a shelter and timetable information, as indicated by **Figure 3.19**. It is noted that this stop it outwith the recommended 400m walking distance from most areas within the site which is stated within the PAN 75 document.

Figure 3.19 Bus Stop on Annsbrae Place

Source: SYSTRA

3.6.2 Annsbrae Place is on the main A969 thoroughfare, therefore the majority of bus services operating within / from Lerwick pass this stop. The bus services which operate at the bus stop on Annsbrae Road and the frequency of the service are indicated within **Table 3.1**.

Table 3.1 Bus Services, Routes and Frequencies

OPERATOR	SERVICE NO.	ROUTE	FREQUENCY		
			Mon – Fri	Sat	Sun
JLS	1	Lerwick Town Centre Circular	1 hour	1 hour	No service
JLS	4	Lerwick – Scalloway	1 hour	1 hour	4 services at approx. 13:00, 15:00, 17:00 and 19:00
JLS	6	Lerwick – Sumburgh	1 – 1.5 hours	1 – 1.5 hours	services approx. every 2 hrs between 09:00 & 19:00
SIC	9	Lerwick – Walls	6 services at approx. 07:00, 09:20, 12:20, 15:40, 17:10 & 21:20	No service	No service
SIC	12	Lerwick – Aith	1 service at approx. 17:10	No service	No service
JLS	19	Lerwick – Vidlin	3 services at approx. 07:30, 11:15, 17:05	3 services at approx. 07:30, 11:15, 17:20	No service
JLS	21	Lerwick – Hillswick	3 services at approx. 09:00, 14:10, 17:15	No service	No service
JLS	23	Lerwick – Mossbank and Toft	2 – 3 hours	No service	No service
RGJ	24V	Lerwick – Cullivoe	1 service at approx. 14:25	No service	No service
JLS	41	Lerwick - Bressay	1 service at approx. 14:00 on Tuesdays only	No service	No service

Source: Traveline Scotland (June 2019)

3.6.3 **Table 3.1** indicates that there is a total of 10 services operating at the bus stop on Annsbrae Road. Monday to Friday there are three services operating regularly on an hourly basis and seven infrequent services. On Saturdays there are also three regular services operating on an hourly basis and one infrequent service. There are no services on a Sunday.

3.6.4 Further to the services indicated by **Table 3.1**, a "Dial-a-Ride" service is available which operates between Lerwick Viking Bus Station and Tingwall Airport.

Ferry

3.6.5 The site is located within a 10 – 15 minutes walking distance of the Esplanade Ferry Terminal in Lerwick Town Centre which is indicated by **Figure 3.20** below. Ferries run from Lerwick to Bressay on an hourly basis and from Bressay to Lerwick on a half hourly to hourly basis. The crossing takes 7 minutes and vehicles can be taken on-board.

Figure 3.20 Ferry Terminal

Source: SYSTRA

3.7 Road Network

3.7.1 As discussed in paragraph 3.3.1, the site is bound by Lover's Loan and Midgarth Crescent to the north, Twageos Road to the east, Gressy Loan to the south and Knab Road to the west. These roads are generally of a good standard overall and street markings / road signs are generally well maintained.

Lover's Loan and Midgarth Crescent

3.7.2 Lover's Loan is one-way at each end with a small middle section allowing two-way traffic. Lover's Loan is accessible via Midgarth Crescent and Breiwick Road, both of which are also one-way. Where Midgarth Crescent meets Lover's Loan, vehicles can turn right to route back to Twageos Road while a left turn meets Knab Road. It is a left turn only where Breiwick Road meets Lover's Loan. Lover's Loan is subject to a 20mph speed limit.

3.7.3 Parking restrictions are in place along sections of Lover's Loan whereby vehicles are not permitted to park or wait outside the High School's egress or park along a section of the northern side of the road between Monday and Saturday 08:00 to 18:00. The general characteristics of Lover's Loan is indicated by **Figure 3.21**.

Figure 3.21 Lover's Loan

Source: SYSTRA

Twageos Road

3.7.4 Twageos Road is a single carriageway road which runs between Commercial Street and the Cemetery. Where Twageos Road continues on from Commercial Street the road is one-way heading south, from Midgarth Crescent onwards Twageos Road is two-way.

3.7.5 Twageos Road is subject to a 30mph speed limit and has accommodation for on-street parking without restrictions in place. The general characteristics of Twageos Road are indicated by **Figure 3.22** below.

Figure 3.22 Twageos Road

Source: SYSTRA

Gressy Loan

3.7.6 Gressy Loan is a single-carriageway road running between Twageos Road and Knab Road, and is subject to a 20mph speed limit. The general characteristics of Gressy Loan are indicated by **Figure 3.23**. Opposite to the High School's hardstanding playground area there is a parking bay able to accommodate approximately 10 vehicles, as can also be seen in **Figure 3.23**. On-street parking is permitted along Gressy Loan apart from a small section outside the Coast Guard where parking or stopping is not permitted, as indicated by **Figure 3.24**.

Figure 3.23 General Characteristics of Gressy Loan

Source: SYSTRA

Figure 3.24 Coast Guard on Gressy Loan

Source: SYSTRA

Knab Road

3.7.7 Knab Road routes between the Knab Road / A969 / Greenfield Place Roundabout and the leisure car park for "The Knab" walking route. Knab Road is single carriageway and is subject to a 30mph speed limit for the most part with traffic calming measures in place at the section between Breiwick Road and the roundabout where it reduces to a 20mph speed limit. The general characteristics of Knab Road are indicated by **Figure 3.25**.

Figure 3.25 General Characteristics of Knab Road

Source: SYSTRA

3.7.8 On-street parking is permitted along Knab Road adjacent to the site, however, sections outside the properties opposite Lerwick Cemetery and on the approach to the Knab Road A969 / Greenfield Place Roundabout are restricted, as indicated by **Figure 3.26**.

Figure 3.26 Parking Restrictions on Knab Road

Source: SYSTRA

Knab Road / Church Road / Annsbrae Place / Greenfield Place Roundabout

3.7.9 As mentioned in Chapter 2, initial discussions with SIC Transport Planning were undertaken. SIC Transport Planning raised that any traffic impact on the Knab Road / Church Road / Annsbrae Place / Greenfield Roundabouts should be considered as the masterplan develops. As the masterplan develops, further discussions will be undertaken. This junction is indicated by **Figure 3.27** below.

Figure 3.27 Off-Street Car Parking off Church Road

Source: SYSTRA

Off-Street Parking

3.7.10 Two off-street car parking area were observed within the vicinity of the site during the site visit, able to accommodate approximately 50 vehicles collectively. These are indicated by **Figure 3.28**. There are no road signs indicating parking restrictions, however, they are understood to be long stay parking for people working within the town centre or residents living on Church Road.

Figure 3.28 Off-Street Car Parking off Church Road

Source: SYSTRA

3.7.11 An off-street parking area is also provided off Knab Road adjacent to the skate-park. It would appear that this area is used to store coaches as two coaches were observed during the site visit (2017) and two coaches can also be seen parked here on Google Maps "street view" (2015). This car parking area is indicated by **Figure 3.29** below.

Figure 3.29 Off-Street Car Parking off Church Road

Source: SYSTRA

3.7.12 Another off-street car park is provided at the most southern point of Knab Road for leisure purposes, providing parking for those doing "The Knab" walking route with space for approximately five cars.

3.8 Existing Traffic

3.8.1 During the site visit, traffic on the main road links within Lerwick was observed during the traditional network peak periods which are 08:00 – 09:00 in the morning and 16:00 – 18:00 in the evening.

3.8.2 The site visit observed that during both the AM and PM periods there was a steady flow of vehicles through the South Road / South Lochside / Sea Road (to Tesco) Roundabout junction which is the main point into and out of Lerwick. No queues were observed at this junction during the AM and PM periods.

3.8.3 During the AM peak period a steady flow of vehicles travelled down the A970 South Lochside, past the site of the new Anderson High School and halls of residence and down the A969 North Road in the direction of Toll Clock Shopping Centre and the town centre.

3.8.4 During the PM peak at around 16:00 there was a steady flow of vehicles traveling southbound along the Esplanade lasting for a short period of time. At 17:10, a queue of 11 cars was observed on King Harald Street waiting to turn right onto the A969, lasting for only a few seconds.

3.9 SWOT Analysis

3.9.1 An overall analysis of the Knab site's strengths, weaknesses, opportunities and threats (SWOT analysis) in relation to traffic and transport has been undertaken and is detailed in **Table 3.2**.

Table 3.2 SWOT Analysis

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	GENERAL THREATS
Walking	• The site is within walking distance of Lerwick Town Centre • Generally good standard footways and pedestrian crossing opportunities • Ferry terminal is within reasonable walking distance of the site	• The gradient of the site could be a barrier to walking for the mobility impaired • No bus stop within 400m of the site and services will not be diverted through the site	• Provide facilities for mobility impaired within the site, such as ramped accesses • Improved street lighting throughout the internal roads would help create a 'safer' environment for pedestrians • The provision of improved facilities for walking and cycling as a means of providing greater travel choice are key principles of SIC "Our Plan" and the Shetland Transport Strategy	• Proposed new developments in the study area may have significant traffic generating land uses. This would have a knock-on effect of making walking and cycling less desirable if not considered as part of the design fabric • Listed buildings within the site will need to be factored into masterplan proposals and transport framework
Cycling	• Surrounding roads are predominantly of a residential nature and conducive to low vehicle speeds • NCR 1 is approximately 700m north-west (direct distance) of the site	• There is no designated on-road cycle infrastructure • The gradient of the land could be a barrier for some less experienced cyclists	• Cycle facilities can be incorporated into the internal road network of the site and cycle parking can be provided for any public land uses • The provision of improved facilities for walking and cycling as a means of providing greater travel choice are key principles of SIC "Our Plan" and the Shetland Transport Strategy	• The site's former use as Anderson High School campus will have generated morning and afternoon vehicle peak periods when the school began and finished. Any new land uses will result in a change of the afternoon peak period to late afternoon, typically between 16:00 – 18:00

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	GENERAL THREATS
Public Transport	• North-western areas of the site are within 400m walking distance of the bus stop on Annsbrae Place • Reasonable number of regular bus services on weekdays • Esplanade ferry terminal in within a 15 minute walk of the site	• The nearest bus stop is outwith 400m walking distance for most of the site • No bus services operate on a Sunday • Other than bus, public transport options are limited	• Potential to add or amend bus service routes through the Knab site • Opportunity to integrate public transport into the developing proposals to encourage the use of sustainable modes from the offset	• Adequate car parking will need to be provided on-site, however it should not be seen to facilitate car use where sustainable travel options are available
Road Network	• Current usage of the road surrounding the site is for access to adjacent properties, cemetery or leisure car park for "The Knab" viewpoint and walking route, i.e. the roads are not depended on as thoroughfares. • Surrounding roads are conducive to low vehicle speeds and traffic calming measures are in place	• One-way system through Midgarth Crescent channels vehicles down Lover's Loan • The location of the access points are to be retained and may not be suitable for development proposals • Knab Road / Church Road / Annsbrae Place / Greenfield Place Roundabout has physical constraints	• Car parking can be incorporated within the site and provided in a sympathetic manner • Potential to create a similar distribution of traffic along the main roads running adjacent to the development site as the former use	

4. MASTERPLAN DEVELOPMENT TRAVEL CHARACTERISTICS

4.1 Overview

4.1.1 This chapter considers the people trip generation for the proposed masterplan development and the resultant vehicle trip generation.

4.1.2 The vehicle trip generation potential of the land uses that make up the masterplan proposals is considered and assessed in relation to the road network's "peak periods". Each network has a unique morning (AM) and afternoon / evening (PM) peak period which is typically a one hour period within the range of 07:30 – 09:30 and 15:00 – 18:00 in the AM and PM respectively, depending on the local characteristics. These peak periods are usually associated with commuter travel patterns and school drop-of / pick-up times. They are considered as the "crucial" periods times during the day which are sensitive to changes in traffic levels, hence, have been considered within this assessment.

4.1.3 Data from traffic surveys of the local road network undertaken by AECOM in 2009 (to inform the previous TA for the masterplan site) and SIC in 2017 have been utilised to determine the local network's AM and PM peak hour periods.

4.2 Masterplan Development Land Uses

4.2.1 The proposed development content of the site has evolved as the masterplan has developed. The previous schedule of accommodation included 175 residential units (of which two-thirds would be social housing and a third private), a hotel and various recreational, businesses and community uses within the listed buildings.

4.2.2 The current proposals for the masterplan development, informed by a consultation process, comprises a maximum of 140 residential units comprising the following schedule of accommodation:

- 27x 1 bed cottages – affordable;
- 5x 2 bed cottages – affordable;
- 6x 3 bed houses – affordable;
- Flat blocks comprising 47x 1 bed flats and 23x 2 bed flats - affordable;
- 1, 2 and 3 bedroom cottages – affordable; blocks comprising 1 and 2 bed flats
- 32x 3 bed houses – private self-build;

4.2.3 It is anticipated that approximately three-quarters of the residential units will be developed by SIC whilst the remaining quarter will be private developer(s). There are four buildings on the site which will be retained, three of which are listed buildings (former Anderson High School, Janet Courtney Hostel and Bruce Hostel). These buildings are proposed to house the other land uses.

4.2.4 The proposed masterplan development would be brought forward in phases which seeks to balance construction logistics with a placemaking strategy for growing into the area incrementally. The phasing strategy is yet to be finalised but it is assumed that the residential units will be developed in six phases as indicated by **Figure 4.1**.

Figure 4.1 Potential Masterplan Phasing Strategy

Source: 7N Architects

4.3 People Trip Generation

4.3.1 In line with best practice, the TRICS database has been utilised to obtain indicative people trip rates for the residential element of the proposed masterplan development. The potential people trip generation of the other land uses has not be calculated as the number of bedrooms / gross floor areas are unknown at this stage.

4.3.2 The TRICS database is an online resource containing travel mode characteristics for a range of development types such as social and private residential, schools, restaurants, offices and supermarkets. The TRICS database is an industry standard tool and its application as a resource for trip generation calculation and benchmarking is uniform across Scottish local authority areas for assessing the trip generation potential of developments.

4.3.3 TRICS has been used for the purposes of this report in order to determine the number of generated people trips associated with each land use within the masterplan site could potentially generate. The TRICS output files are contained within Appendix B.

Residential Units

4.3.4 The split of housing types is assumed to be 77% social and 23% private. As indicated in section 4.2, the private housing is proposed in the form of 32x 3 bedroom houses whilst the social housing is a mixture of 1 and 2 bed cottages, 3 bed houses, and 1 and 2 bed flats.

4.3.5 The people trip generation for the social housing units and private housing units has been calculated separately as the two categories of housing have varied travel characteristics. The TRICS database has been interrogated under the category "03 – Residential" and sub categories "B – Affordable / Local Authority Houses" and "A – Houses Privately Owned" to represent the travel characteristics of the social and private housing units respectively.

4.3.6 TRICS provides a trip rate per dwelling for the social and private housing categories. This trip rate has then been applied to 108 units of social housing and 32 units of private housing respectively. The trip generation is demonstrated during the peak AM and PM periods.

4.3.7 The arrivals, departures and total two-way people trip generation for the social and private housing are indicated by **Table 4.1** below.

Table 4.1 Social and Private Housing Total People Trip Generation

TIME	SOCIAL (108 UNITS)		PRIVATE (32 UNITS)		TOTAL
	ARRIVAL	DEPARTURE	ARRIVAL	DEPARTURE	TWO-WAY
AM	21	68	8	26	**123**
PM	53	31	18	11	**113**

4.3.8 **Table 4.1** indicates that the AM peak period the residential element of the masterplan development is anticipated to generate 123 two-way total people trips (29 arrivals and 94 departures).

4.3.9 During the PM peak periods the residential element of the masterplan development is expected to generate 113 two-way total people trips respectively (71 arrivals and 42 departures).

4.3.10 This chapter focusses on the estimated vehicle trip generation of the land uses that make up the masterplan proposals which is detailed in the sections to follow. However, Scottish Census 2011 data local to the area has been reviewed to gain an understanding of the potential modal split of total people trips associated with the proposed masterplan development.

Mode Share

4.3.11 Population data was extracted from table "QS702SC – method of travel to work or study – all people" for the residential areas surrounding the masterplan site. The data obtained details the usual (main) mode of travel to work or study for residents living in the general are of the masterplan site within Lerwick. The mode share according to the census data is indicated by **Table 4.2**.

Table 4.2 Mode Share

MODE	MODE SHARE
Car Driver	49%
Bus	3%
Taxi	1%
Car Passenger	15%
Bicycle	0%
On Foot	31%

4.3.12 **Table** 4.2 indicates that almost a third of total people trips arriving / departing the local area travelling to / from work or place of study are made on foot and a small proportion of trips are made by public transport (3%). Almost half of people trips are made by car drivers, whilst 16% of trips are also car based but do not manifest as additional vehicles on the local road network (i.e. car passenger and taxi).

4.3.13 Whilst this mode share is likely to be reflected by the future residents of the proposed masterplan development given the local characteristics (outlined in more detail within Chapter 3), a robust approach to vehicle trip generation has been adopted which is detailed in Section 4.4 below.

4.4 Vehicle Trip Generation

4.4.1 At this stage in the masterplan process, the mix of housing types and the number of bedrooms / gross floor area of the other land uses are yet to be finalised. Therefore, the vehicle trip generation of the proposed masterplan development has been calculated from a first principles approach on the basis of the car parking provision proposed for the masterplan development.

Residential Units

4.4.2 The car parking provision for the residential element of the masterplan proposal is in line with SIC's parking standards for residential developments within Lerwick conservation areas, contained within the Shetland LDP (2012) Supplementary Guidance.

4.4.3 The guidelines for Lerwick conservation areas state a parking requirement of one space per residential unit. It is noted that the proposed masterplan development is not situated within the Lerwick New Town or Lerwick Lanes conservation areas, this is discussed further in Chapter 5.

4.4.4 Car parking provision for the residential element of the masterplan is proposed at a rate of 1.12 spaces per unit, equating to a total provision of 157 spaces. To ensure a robust assessment, it has been assumed that every parking space will be in use and each of the 157 vehicles would make an outward or inward trip during the AM and PM peak hour periods. It should be noted that, in reality, every vehicle would not necessarily be used for travel during the peak times or each day.

4.4.5 In reference to the total people trips for the residential elements, as indicated by **Table 4.1** TRICS estimates that the residential element of the proposed masterplan development would generate only 123 and 113 two-way total people trips in the AM and PM periods respectively. Furthermore, if the car driver mode share from the census data (indicated by **Table 4.2**) was to be applied to the total people trips from TRICS, this would equate to 60 two-way vehicle trips in the AM and 55 two-way vehicle trips in the PM. Therefore, assuming 157 two-way vehicle movements in the AM and PM periods for the residential element of the proposed masterplan development is a robust approach to the vehicle trip assessment, and therefore considered as the "worst-case" scenario.

Other Land Uses

4.4.6 It is noted that the proposed other land uses within the existing listed buildings (e.g. hotel, community, business and recreational) will provide car parking and will have associated vehicle movements. There will be 72 additional car parking spaces allocated for these uses.

4.4.7 While the final uses of the listed buildings are yet to be determined and demand may vary from this level, a robust approach has been taken to the vehicle trip assessment and it is assumed that each of these car parking spaces will translate into a two-way movements in the AM and PM peak periods.

4.4.8 Across the masterplan site, this would equate to a total of 229 vehicle movements to / from the site during the AM and PM peak hour periods respectively.

4.5 Vehicle Trip Distribution and Assignment

4.5.1 In order to evaluate the impact of additional traffic on the local road network as a result of trips generated by the proposed masterplan development, it is necessary to determine the distribution and assignment of these trips across the identified area of influence.

Arrivals / Departures

4.5.2 The TRICS database was utilised to estimate what proportion of the 229 two-way vehicle trips anticipated to be generated during the peak periods would be arrivals and departures to / from the masterplan development.

4.5.1 The ratio of arrivals and departures gained from TRICS and the corresponding number of vehicle trips in relation to the proposed masterplan development is indicated by **Table** 4.3.

Table 4.3 TRICS Ratio of Arrivals and Departures during Peak Periods

PERIOD	ARRIVALS		DEPARTURES	
	PROPORTION	NO. OF VEHICLE TRIPS	PROPORTION	NO. OF VEHICLE TRIPS
AM	26%	52	74%	148
PM	66%	132	34%	68

Distribution / Assignment

4.5.2 The distribution of vehicle trips associated with the proposed masterplan development during the AM and PM peak periods has been estimated taking into consideration the geography of the area (i.e. the situation of the site on a headland, bound directly to the south, east and west by the sea) and the location of likely places of work and study within and around Lerwick. This includes consideration that Anderson High School, which formerly occupied the site, has been relocated to the western side of Lerwick adjacent to the A970.

4.5.3 The distribution and assignment of vehicle trips also takes into account that a proportion of residents are likely to work within the town centre which is located to the north of the masterplan site and within walking distance for some residents, depending on location of their property within the wider masterplan site and being able-bodied. In addition, the primary route out of Lerwick is along the A969 followed by the A970, heading westbound from the masterplan site.

4.5.4 It has been predicted that 70% of vehicle trips would route between the proposed masterplan site and areas to the north and west both within and outwith Lerwick, whilst the remaining 30% would route between the proposed masterplan development and the general town centre area. The distribution and assignment of vehicle trips is indicated in Appendix C.

4.5.5 Chapter 6 contains the traffic impact assessment which details the predicted impact that the vehicle trips generated by the masterplan development would have on the local road network, specifically, the four-arm roundabout between Church Road, Greenfield Place, Knab Road and Annsbrae Place.

5. MEASURES TO SUPPORT THE MASTERPLAN DEVELOPMENT

5.1 General

5.1.1 This chapter considers the integration of the masterplan development into the surrounding transport network as well as identifying measures that are likely to be required to support the masterplan proposals. **Figure 5.1** demonstrates the indicative masterplan layout and a copy is included in Appendix A.

Figure 5.1 Masterplan Layout

Source: 7N Architects

5.2 Walking

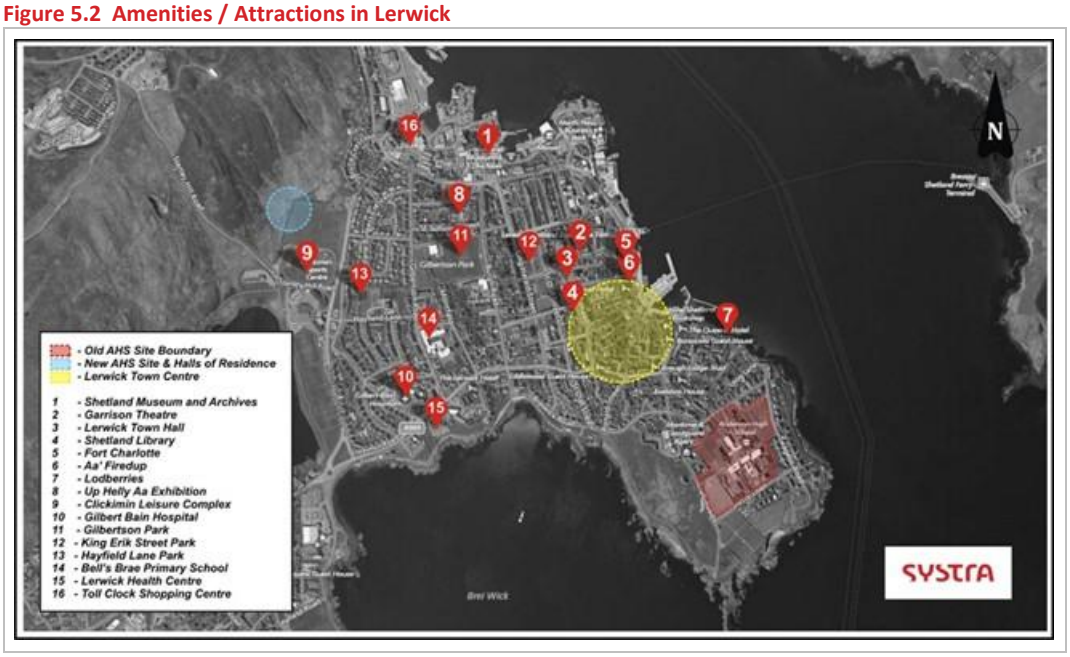
5.2.1 Government guidelines indicate a hierarchy of travel modes with walking being the highest and most sustainable form of travel. It is clear that walking will not reduce long distance trips but encouraging walking will reduce short distance vehicle trips, provide linkage to public transport and as an added benefit, to improve health and fitness.

5.2.2 Transport Scotland's Transport Assessment Guidance (TAG) recommends that journey times of up to 20 – 30 minutes (1600m – 2400m) are appropriate for walking. **Figure 5.3** indicates walking isochrones for 10, 20 and 30 minute walking distance from the masterplan development site, assuming an average walking speed of 1.4 metres per second.

Amenities Within Lerwick

5.2.3 **Figure 5.2** indicates the location of various local amenities and attractions within Lerwick in relation to the masterplan development.

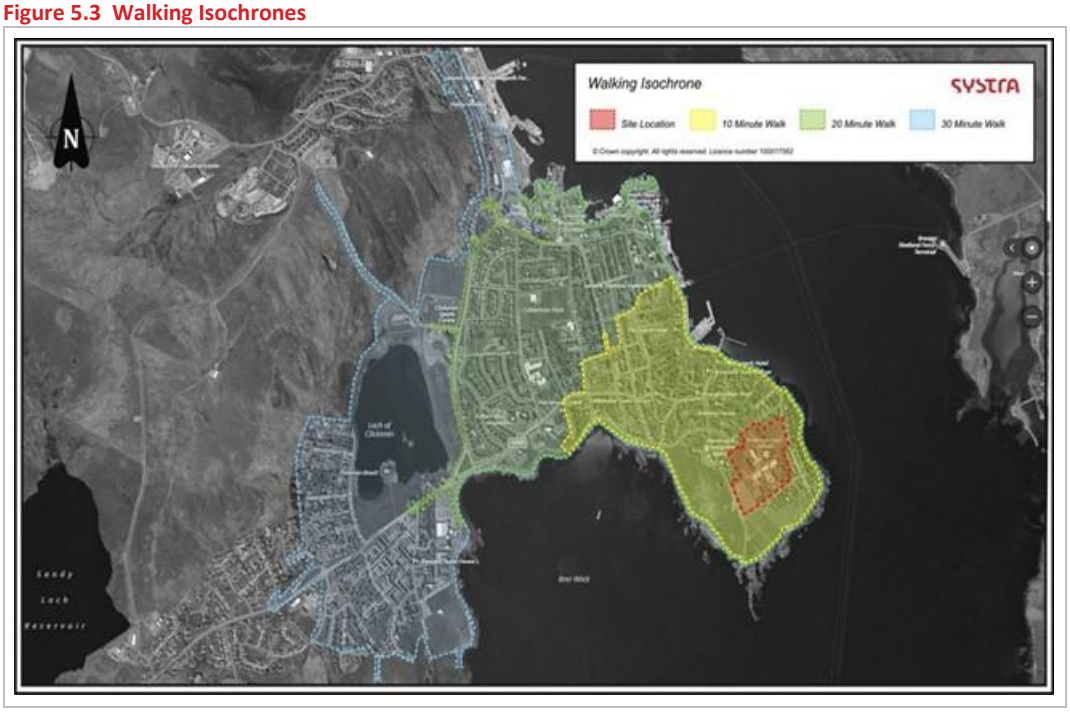
Figure 5.2 Amenities / Attractions in Lerwick



Source: Bing Maps & SYSTRA

5.2.4 Based on a walking speed of 1.4m/s, **Figure 5.3** demonstrates walking isochrones for 10, 20 and 30 minutes walking distance from the masterplan development.

Figure 5.3 Walking Isochrones



Source: Bing Maps & SYSTRA

5.2.5 The Scottish Government's Transport Assessment Guidelines (TAG) recommends that a journey time of 20 – 30 minutes (and under) are appropriate for walking.

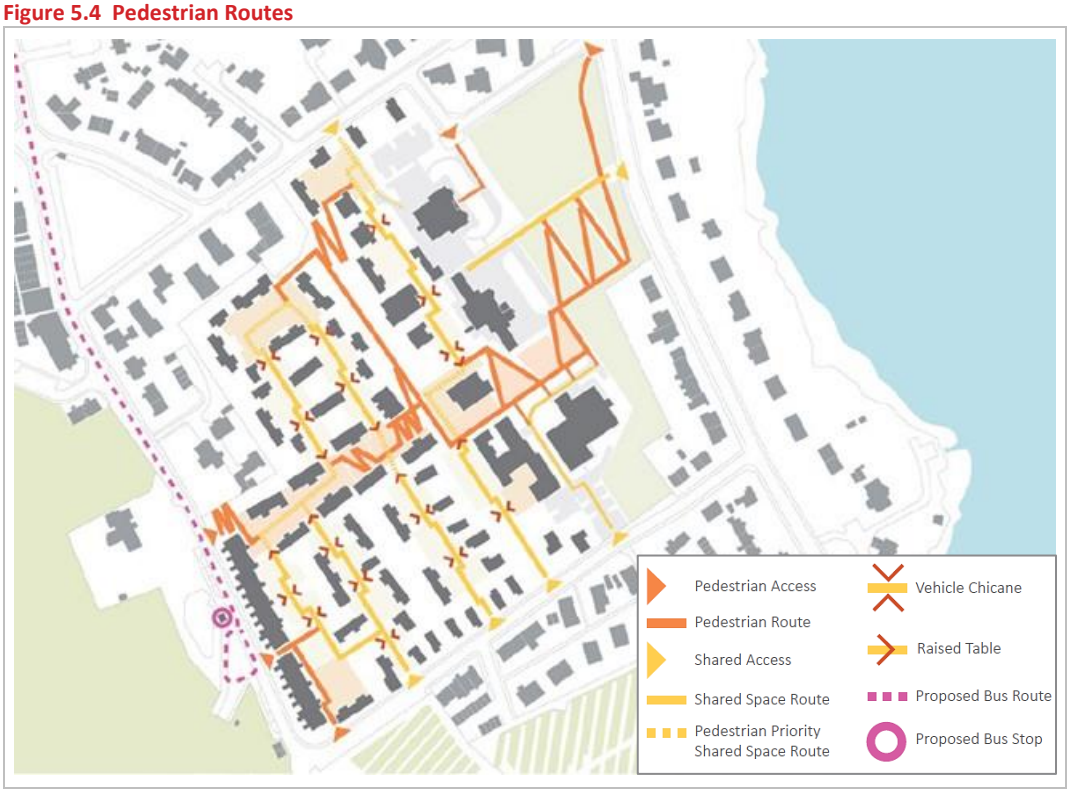
5.2.6 **Figure 5.3** demonstrates that almost all of the amenities / attractions indicated in **Figure** 5.2 are within a 20 minute walking distance from the masterplan development. **Figure 5.3** also demonstrates that Lerwick Town Centre is within an approximate 10 minute walk from the masterplan development and the new Anderson High School Site (adjacent to Clickimin Sports Centre) is within an approximate 30 minute walk.

Pedestrians and the Development Layout

5.2.7 In order to maximise the potential number of pedestrian trips generated by the masterplan development, it will be designed with multiple pedestrian access points, through routes, green spaces and squares, as indicated by **Figure 5.4** below. Delivering a permeable layout will create a welcoming pedestrian environment and promotes low vehicle speeds. This is in accordance with the relevant local and national policies discussed in Chapter 2.

5.2.8 The proposals include two designated pedestrian access points from Knab Road and one onto Gressy Loan, as indicated by **Figure 5.4**. Additionally, pedestrians will also be able to gain access to the masterplan developments via the vehicular access points by footways. There will be three vehicular access points from Gressy Loan and one from Lover's Loan.

Figure 5.4 Pedestrian Routes



Source: 7N Architects

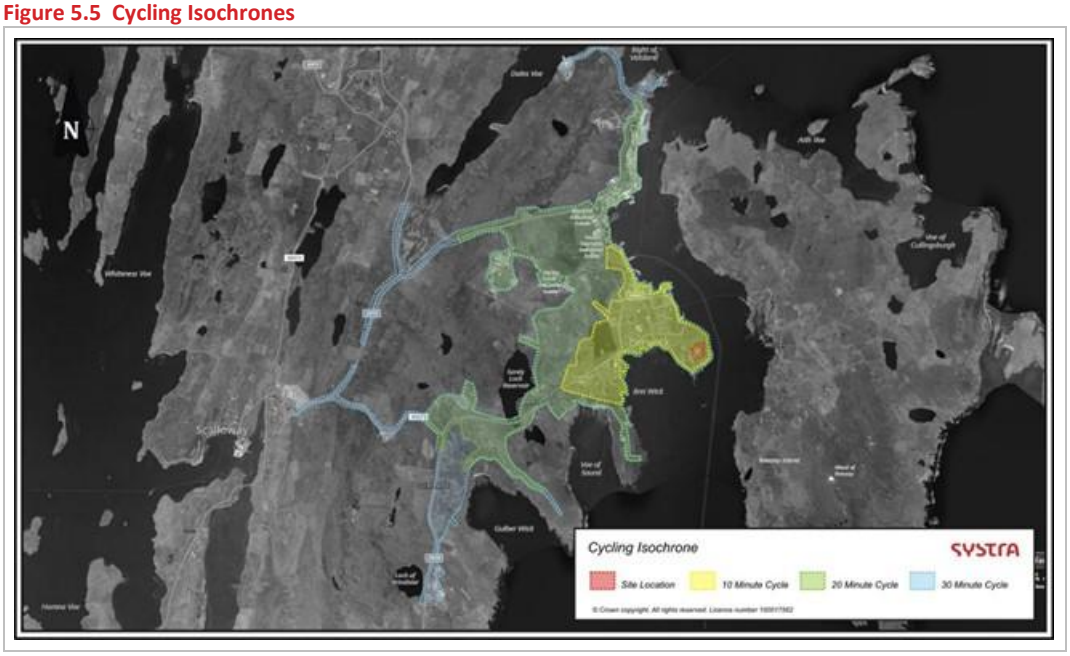
5.3 Cycling

5.3.1 As discussed in Chapter 3, there are no formal on-road or off-road provisions for cyclists in Lerwick such as designated cycle lanes, however, the National Cycle Network Route (NCR) 1 follows the A969 into Lerwick and along King Herald Street to re-join the A969 at the junction with North Road / Commercial Road.

5.3.2 In general, the roads surrounding the site are conducive to cycling in that they are good standard residential roads which are lightly trafficked and have traffic calming measures in place (in the form of speed cushions and 20mph speed restrictions in sections). However, it is noted that variable gradient throughout the site and Lerwick as a whole and that inclement weather conditions typical to Shetland can also act as a barrier to encourage cycling as a viable mode of transport.

5.3.3 Notwithstanding the above, cycling isochrones have been produced to provide an indicative representation of 10, 20 and 30 minutes cycling distance from the masterplan development (assuming a cycling speed of 16km/h[3]) as demonstrated by **Figure 5.5**.

Figure 5.5 Cycling Isochrones



Source: Bing Maps & SYSTRA

5.3.4 **Figure 3.21** indicates that, for those inclined to cycle despite potential barriers, Lerwick Town Centre is less than 5 minutes cycling distance from the site. Furthermore, all of Lerwick, Sound to the south-west and Holmsgarth to the north-west are within a 20 minute cycle from the masterplan development.

Cycle Parking

5.3.5 Within the SLDP Supplementary Guidance document, comment in relation to cycle parking provision for new developments is as follows:

[3] The cycling speed assumed by Google Maps for cycle journey times

"Although Shetland is not an ideal cycling environment because of the weather, it is Council policy to bear the needs of cyclists in mind when considering all proposals. Developers are encouraged to provide cycle racks and other facilities for employees and visitors / customers as appropriate"

5.3.6 Considering the above, cycle parking will be provided for the hotel, recreational, business and community uses within the masterplan development proposals. The quantity of cycle parking racks will be agreed with SIC in due course.

5.4 Public Transport

5.4.1 Chapter 3 discusses that the nearest bus stop to the proposed masterplan development is located on Annsbrae Place near the Knab Road / Church Road / Greenfield Place / Annsbrae Place Roundabout. This stop is approximately 850m from the furthest away point of the development and 450m from the centre of the development. This bus stop includes a shelter and timetable information.

5.4.2 It is recognised that this stop is outwith the recommended 400m walking distance from most areas within the site which is stated within the PAN 75 document. Notwithstanding this, the existing bus stop is approximately a 10 minute walk from the furthest point of the masterplan development. Therefore, indicating that all of the proposed residential units would be within a 10 minute walk or less of the bus stop, therefore, it is considered that residents / visitors of the development would be able to access the bus services operating from this stop.

5.4.3 It is discussed within the Development Brief produced by SIC for the masterplan project, that no additional bus infrastructure or services are proposed as part of the development proposals. It is considered that this distance and the level of service provided at this stop is sufficient to serve the proposed masterplan development.

5.4.4 Notwithstanding this, a potentially suitable location for a new bus stop and bus turning area adjacent to the proposed masterplan development has been identified on Knab Road, adjacent to the skatepark. This area is currently used as a coach parking/storage area, therefore, demonstrating that there is sufficient space to manoeuvre a bus-sized vehicle here. To establish the feasibility of rerouting existing bus services to serve a potential new stop on Knab Road, discussions would need to be had at an appropriate time with the bus operators.

5.5 Vehicle Access Arrangement

5.5.1 Vehicular access from the local road network to the proposed masterplan development will be provided from four points: three from Gressy Loan and another from Lover's Loan.. This arrangement is consistent with the current arrangements for the site whereby the main access points are from Gressy Loan and Lover's Loan, albeit, the new access arrangement will allow a straight-through movement through the development between Lover's Loan and Gressy Loan which is currently not provided.

5.5.2 This access arrangement will ensure that traffic associated with the masterplan land uses will ultimately create a similar distribution of traffic along the main roads running adjacent to the development site (i.e. Lover's Loan, Twagoes Road, Gressy Loan and Knab Road) to when Anderson High School was operational on the site.

5.6 Car Parking

5.6.1 The SLDP Supplementary Guidance document provides car parking standards per development type, these are indicated by **Table 5.1** in relation to the proposed masterplan land uses.

Table 5.1 SLDP Parking Standards

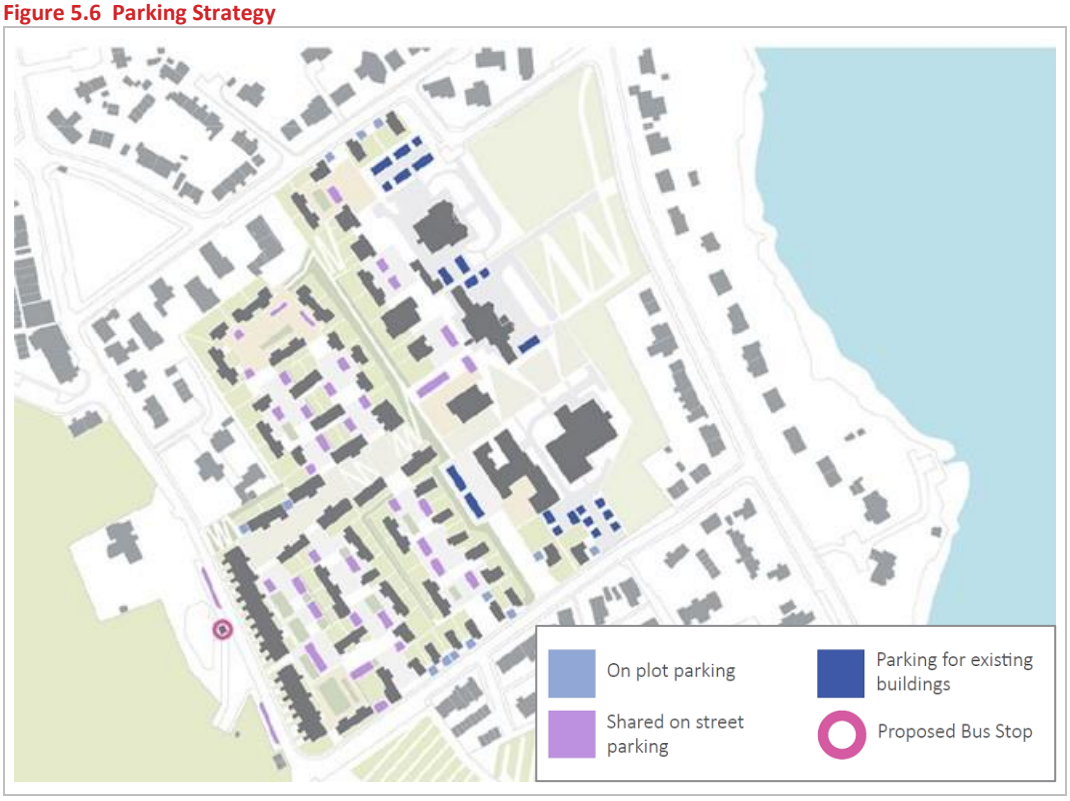
TYPE OF DEVELOPMENT	REQUIRED PROVISION
Residential	
Housing development in the Lerwick and Scalloway Conservation Areas	1 space per dwelling unit
All Other Housing	1.5 spaces per 1 bedroom unit 2 spaces per 2-3 bedroom units 3 spaces for dwelling units with 4 or more bedrooms Where communal parking is provided, the minimum number of parking spaces required for dwelling units of 2 or more bedrooms may be reduced by 20% for each communal space provided outside the curtilage of the proposed dwelling units.* For example, a scheme of ten 2 bedroomed units would require a total provision of 20 spaces. If all the spaces were provided as communal spaces only 16 spaces would be required. If each dwelling unit had a single parking space within each curtilage, 8 communal spaces would be required (i.e. 18 spaces in all).
Redevelopment Sites within urban areas (property conversion or brownfield development)	Requirements as above with; 1 space per unit within the curtilage and the balance within reasonable walking distance**

TYPE OF DEVELOPMENT	REQUIRED PROVISION
Community Uses	
Café's Restaurants, Community Centres, Functions Rooms and Social Clubs	20 spaces per 100sqm gross floor area
Hotel	
Hotels	1 space per bedroom and 1 space per 3 staff

**Only applies for schemes of 5 or more dwelling units*
*** Reasonable walking distance is defined as; three minute walk for able-bodied adult*

5.6.2 As previously discussed in Chapter 4, the masterplan proposals will include 1.15 car parking space per residential unit an additional parking for the other land uses. The parking strategy is indicate by **Figure 5.6** below.

Figure 5.6 Parking Strategy



Source: Bing Maps & SYSTRA

5.6.3 Whilst it is acknowledged that this provision falls short of the standard for "all other housing" types, it is in line with the standards for housing developments within Lerwick conservation areas and redevelopment sites within urban areas.

5.6.4 The SLDP Supplementary Guidance states that reduced parking standards may be considered acceptable where a housing development has exceptionally good access to public car parking, shops, leisure facilities and regular bus services. Whilst the masterplan development is not within three minutes walking distance of facilities / amenities, the town centre is approximately a 10 minute walk from the furthest away point of the development site via a well-established network of footways. This is considered by SYSTRA as a reasonable walking distance and route for the able-bodied. In addition, on-street parking opportunities exist along each of the adjacent streets to the development site, therefore the site does have good access to public car parking.

6. TRAFFIC IMPACT ASSESSMENT

6.1 General

6.1.1 This section details the methodology and outcome of the assessment of impact that the vehicle trips generated by the masterplan development would have on the local road network, specifically, the 4-arm roundabout between Church Road, Greenfield Place, Knab Road and Annsbrae Place. This roundabout has been identified for further consideration / assessment as it is understood that local residents have concerns about the masterplan proposal's traffic impact at this junction.

6.2 Base Traffic

6.2.1 To identify the existing level of traffic at the Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout, existing turning count traffic data was obtained from the historical TA prepared in 2009 for the masterplan site in relation to replacing the existing Anderson High School building with a new build school on the same site.

6.2.2 To inform the TA, junction turning count surveys were undertaken at the roundabout on Thursday 17th January 2009 and the weekday AM and PM peak periods were identified as 08:30 – 09:30 and 15:00 – 16:00 respectively.

6.2.3 SIC undertook link flow surveys of Knab Road in June 2017 which demonstrated the same AM and PM peak hour flows as the 2009 turning count flows. In order to accurately bring the historical turning count flows up-to-date, a factor was calculated based on the 2017 data for Knab Road and then applied to the 2009 turning count flows. Where the 2009 turning count flows were higher than the 2017 link flow factor, the higher value was used to represent a robust assessment of the operation of the junction. This approach was approved by SIC.

6.2.4 It should be noted that the turning count flows for the roundabout undertaken in 2009 include traffic associated with Anderson High School when it was situated on the masterplan site. Similarly, the 2017 link flows by SIC were undertaken during term time when the school was still operational on the masterplan site, therefore captures traffic movements associated with school. No reduction in values has been applied to account for the before the masterplan development traffic has been added to the junction to represent a robust assessment.

6.2.5 The 2017 base traffic flows for the weekday peak periods are provided in Appendix C of this report.

6.3 Masterplan Development Opening Year

6.3.1 As discussed, the masterplan development is likely to be constructed in six stages and take approximately six years from start to finish. Assuming construction begins in 2020, this would mean the development would become fully operational in 2026.

6.3.2 In accordance with TAG, the junction assessment has been carried out for the anticipated year of opening when all six phases are anticipated to be complete.

Base Traffic Growth Forecast

6.3.3 Assuming an opening year for the full masterplan development of 2026, a National Road Traffic Forecast (NRTF) growth factor has been applied to the 2017 base traffic flows to represent the projected traffic scenario for the year of opening. The NRTF "low" growth factor has been applied in this case. Between 2017 and 2026 this translates as a growth factor of 1.060.

6.3.4 The network diagrams provided in Appendix C indicate the traffic flows at the Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout factored to 2020 (base year for beginning construction) and 2026 (opening year).

6.4 Junction Assessment Methodology

6.4.1 ARCADY 6 transport planning junction assessment tool has been used to carry out the traffic impact analysis of the roundabout. Appendix D includes a complete set of output files associated with the ARCADY model, with the results discussed in the remainder of this chapter.

ARCADY Analysis Reporting

6.4.2 The ARCADY analysis will report the Ratio of Flow Capacity (RFC) and maximum forecast queue for each movement within the junction. The RFC of a junction is one of the principle factors in influencing queues and delays.

6.4.3 General engineering design principles as set out in the DMRB are that when assessing a priority junction or roundabout, RFC levels should not exceed 0.85 in order for the junction to operate within 'practical' capacity. Should the RFC level exceed 1.0 then the junction is considered to operate above 'theoretical' capacity.

Church Road / Greenfield Place / Knab Road / Annsbrae Place Roundabout

6.4.4 The results of the ARCADY assessment for the roundabout are indicated by **Table 6.1** for the AM and PM peak hours in the 2026 projected base and 2026 projected base plus development scenarios.

Table 6.1 AM and PM Peak Hour Analysis

ARM	AM		PM	
	2026 PROJECTED BASE	2026 BASE + DEV	2026 PROJECTED BASE	2026 BASE + DEV
	RFC (Q)	RFC (Q)	RFC (Q)	RFC (Q)
A	0.331 (1)	0.376 (1)	0.240 (0)	0.353 (1)
B	0.027 (0)	0.028 (0)	0.034 (0)	0.040 (0)
C	0.215 (0)	0.446 (1)	0.321 (1)	0.422 (1)
D	0.549 (1)	0.624 (2)	0.430 (1)	0.573 (1)

Note: Arm A – Church Rd; Arm B – Greenfield Pl; Arm C – Knab Rd; Arm D – Annsbrae Pl

6.4.5 The results from junction assessment indicate that during the 2026 projected base and 2026 base plus development scenarios for both the AM and PM peak hour periods, the roundabout would continue to operate comfortably within its practical capacity and would have residual capacity.

6.4.6 The assessment predicts a maximum RFC of 0.624 on the Annsbrae Place arm (D) of the junction during the weekday AM 2026 base plus development scenario with a two vehicle queue. This represents only one additional queuing vehicle when the full masterplan development is operational. In the weekday PM 2026 base plus development scenario, the maximum RFC predicted is 0.573 on the Annsbrae Place arm with a one vehicle queue.

6.4.7 It is therefore concluded that traffic associated with the full masterplan development can be suitably accommodated by the Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout without causing a detriment to the existing road users. It should be noted that the impact per phase of the masterplan development will be lower than that demonstrated in **Table 6.1** and can therefore be comfortably accommodated within the capacity of the roundabout.

6.4.8 Furthermore, it should be noted that the base traffic levels which have been used in this junction assessment have been derived from 2009 turning count flows which incorporate traffic movements associated with Anderson High School when it operated from the masterplan development site. This assessment has not accounted for any reduction in traffic levels at the roundabout as a result of the relocation of Anderson High School, therefore, the ARCADY results demonstrate a robust assessment of the capacity of the junction.

6.5 Vehicle Trip Generation Comparison Exercise

6.5.1 A high level vehicle trip generation comparison exercise has been undertaken to consider the difference in vehicle trip generation between the former and proposed land uses of the masterplan development site.

6.5.2 The peak periods for the school with respect to vehicle trips are identified within TRICS as 08:00 – 09:00 in the AM and 15:00 – 16:00 in the PM. The total people trip rate identified by TRICS for the residential units has the same AM peak period and two PM periods with similar total people levels, which are 15:00 – 16:00 and 17:00 – 18:00.

Anderson High School

6.5.3 The assumed vehicle trip generation of Anderson High School (the former land use of the masterplan development site) has been calculated using the TRICS database and is based on the approximate number of pupils that attended the school (900).

6.5.4 The approximate vehicle trip generation for the AM and PM peak periods is indicated by **Table 6.2** below.

Table 6.2 Anderson High School Vehicle Trip Generation (900 Pupils)

PERIOD	ARRIVAL	DEPARTURE	TWO-WAY
AM	146	100	246
PM	57	97	154

6.5.5 The table demonstrates that during the AM and PM peak periods, the high school which formerly occupied the masterplan development site would have generated in the region of 246 and 154 two-way vehicle trips respectively.

Proposed Masterplan Development

6.5.6 Comparatively, the assumed maximum vehicle trip generation associated with the proposed masterplan development during the AM and PM peak periods (as detailed fully within Chapter 4) is indicated by **Table 6.3**.

Table 6.3 Masterplan Development Trip Generation

PERIOD	ARRIVAL	DEPARTURE	TWO-WAY
AM	60	169	229
PM	151	78	229

6.5.7 This vehicle trip generation comparison exercise demonstrates that the proposed masterplan development would result in a reduction of vehicle trips during the AM peak period compared to the high school of approximately 17 two-way vehicle trips. On the other hand, there would be an increase in vehicle trips during the PM peak period of approximately 75 two-way vehicle trips.

6.5.8 It should be noted that this is assuming the robust and “worst-case” approach of vehicle trips. Whereas, if the TRICS data with the census mode share applied was to be used in this exercise which indicates 60 and 55 two-way vehicle trips in the AM and PM peak periods respectively associated with the residential element (albeit there would be some additional trips associated with the other land uses), it would demonstrate that there is a reduction in vehicle trips during both peak periods.

6.5.9 Overall, the results (using the robust approach) indicate that the proposed masterplan development would have no net detriment to the traffic levels experienced when Anderson High School occupied the site. However, it is recognised that the PM peak period associated with the masterplan development may occur slightly later than PM peak which was experienced when the school was operational from the site.

7. SUMMARY & CONCLUSIONS

7.1 Overview

7.1.1 SYSTRA Ltd has been commissioned by Shetland Islands Council to provide transport planning advice and input into the development of a masterplan framework for the Anderson High School site in Lerwick. The High School moved to a new site in Autumn 2017 which is located to the north-west of Lerwick, adjacent to Clickimin Sports Centre.

7.1.2 This Transport Framework report follows the guidance and structure of a traditional Transport Assessment in that the report assesses the accessibility of the site to ensure it can be integrated into the surrounding transport network, and sustainable development principles have been adopted.

7.1.3 An exercise has been undertaken in order to understand the anticipated level of people trips that the land uses within the masterplan development could generate. The people trip generation is considered in relation to what proportion of these people trips would manifest as additional vehicle on the local road network and what impact this would have on the local road network. Furthermore, an exercise has been undertaken to consider a comparison in the number and pattern of vehicle trips that Anderson High School generated at the site versus the masterplan proposals.

7.2 Sustainable Travel Modes

Pedestrian and Cyclist Accessibility

7.2.1 The development site has good pedestrian links to the town centre and the neighbouring residential areas. The standard of footways in the surrounding area is generally good and the street signs / road markings are generally well maintained.

7.2.2 Lerwick Town Centre can be reached within a 10 – 15 minute walk from the site and the nearest bus stop is an approximate 10 minute walk (from the furthest point of the site) where several services can be accessed, three of which operate regularly Monday to Friday.

7.2.3 In order to maximise the potential number of pedestrian trips generated by the masterplan development, it will be designed with multiple pedestrian access points, through routes, green spaces and squares. Delivering a permeable layout will create a welcoming pedestrian environment and promotes low vehicle speeds.

7.2.4 In general, the roads surrounding the site are conducive to cycling in that they are good standard residential roads which are lightly trafficked and have traffic calming measures in place. However, it is recognised that variable gradients and inclement weather conditions typical to Shetland can act as a barrier to encourage cycling as a viable mode of transport.

7.2.5 Notwithstanding this, cycle parking will be provided for the other land uses within the masterplan development proposals to support those wishing to cycle. The quantity of cycle parking racks will be agreed with SIC in due course.

Public Transport

7.2.6 No additional bus infrastructure is proposed as part of the development proposals. It is considered that this distance and the level of service provided at this stop is sufficient to serve the proposed masterplan development.

7.3 Vehicular Access Arrangements

7.3.1 Vehicular access from the local road network to the proposed masterplan development will be provided from four points: three from Gressy Loan and another from Lover's Loan, consistent with the current arrangements for the site.

7.3.2 The access arrangement will ensure that traffic associated with the masterplan land uses will ultimately create a similar distribution of traffic along the main roads running adjacent to the development site.

Car Parking

7.3.3 The masterplan proposals will include 1.15 car parking space per residential unit and an additional 75 parking for the other land uses. Whilst it is acknowledged that this provision falls short of the standard for "all other housing" types, it is in line with the standards for housing developments within Lerwick conservation areas and redevelopment sites within urban areas. The level of car parking provision for the masterplan development will be finalised in agreement with SIC.

7.4 Traffic Impact Assessment

7.4.1 This Transport Framework has assessed the potential impact that the vehicle trips generated by the masterplan development would have on the local road network, specifically, the 4-arm roundabout between Church Road, Greenfield Place, Knab Road and Annsbrae Place. A robust and worst-case approach to vehicle trip generation was applied in the assessment.

7.4.2 ARCADY 6 transport planning junction assessment tool has been used to carry out the traffic impact analysis of the roundabout. The results indicate that the roundabout would continue to operate comfortably within its practical capacity and would have residual capacity during the opening year of the full masterplan development (2026).

7.4.3 It is concluded that traffic associated with the full masterplan development can be suitably accommodated by the Church Road / Greenfield Place / Knab Road / Annsbrae Place roundabout without causing a detriment to the existing road users. Furthermore, a vehicle trip generation comparison exercise between the former and proposed uses of the site indicates that the proposed masterplan development would have no net detriment to the traffic levels experienced when Anderson High School occupied the site.

7.5 Overall Conclusion

7.5.1 SYSTRA would conclude that the site is suitable for housing and that the Knab Masterplan development will integrate well into the existing transport network and has the opportunity to contribute towards various national, regional and local policy aims.

APPENDIX A

Indicative Masterplan Layout

General Notes

1. Dimensions are in millimetres unless stated otherwise.
2. Levels are in metres AOD unless stated otherwise.
3. Dimensions govern. Do not scale off drawing.
4. All dimensions to be verified on site before proceeding.
5. All discrepancies to be notified in writing to 7N Architects LLP.

Houses

A - 1 Bedroom Cottage Terrace
B - 2 Bedroom Cottage Terrace
C - 3 Bedroom House Type 01
D - 3 Bedroom House Type 02
E - 3 Bedroom House Type 03

Flatted Blocks

F - 1no. 1 Bed Flat
1no. 2 Bed Flat
G - 2no. 1 Bed Flats
H - 2no. 1 Bed Flats
1no. 2 Bed Flat
H1- 1no. 1 Bed Flat
1no. 2 Bed Flat
1no. Small Business Space
I - 3no. 1 Bed Flats
I1 - 2no. 1 Bed Flats
1no. Small Business Space
K - 2no. 1 Bed Flats
2no. 2 Bed Flats
L - 6no. 1 Bed Flats
3no. 2 Bed Flats

Rev	Date	Reason For Issue	Chk
A	12.02.19	For Information	HK
-	01.02.19	For Information	HK

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Client
Shetland Islands Council

Project
Knab Masterplan

Drawing Title
Site Plan

Status
Information

Scale	Paper Size	Date
1 : 500	@A0	01.02.19

Project No.	Draw No.	Rev No.
116	7N-XX-00-DR-A-05000	A

APPENDIX B

TRICS Output Files

Calculation Reference: AUDIT-700706-180716-0723

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL VEHICLES

Selected regions and areas:

07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	1 days
	WY	WEST YORKSHIRE	2 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
	MS	MERSEYSIDE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 15 to 280 (units:)
Range Selected by User: 14 to 280 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 19/09/13

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	2 days
Thursday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	3
Built-Up Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	1 days
10,001 to 15,000	2 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	2 days
75,001 to 100,000	2 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 LC-03-B-02 SEMI DETACHED/TERRACED LANCASHIRE
BILLINGE STREET

BLACKBURN
Edge of Town Centre
Residential Zone
Total Number of dwellings: 15
Survey date: MONDAY *10/06/13* *Survey Type: MANUAL*

2 MS-03-B-01 TERRACED MERSEYSIDE
TARBOCK ROAD
SPEKE
LIVERPOOL
Edge of Town
Residential Zone
Total Number of dwellings: 16
Survey date: TUESDAY *18/06/13* *Survey Type: MANUAL*

3 NY-03-B-01 TERRACED HOUSING NORTH YORKSHIRE
NORTHALLERTON ROAD
NORBY
THIRSK
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 280
Survey date: THURSDAY *20/09/07* *Survey Type: MANUAL*

4 WY-03-B-02 MIXED HOUSES WEST YORKSHIRE
WHITEACRE STREET
DEIGHTON
HUDDERSFIELD
Edge of Town
Residential Zone
Total Number of dwellings: 54
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

5 WY-03-B-03 TERRACED HOUSES WEST YORKSHIRE
LINCOLN GREEN ROAD

LEEDS
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Number of dwellings: 29
Survey date: THURSDAY *19/09/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL VEHICLES
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.046	4.112	5	79	0.127	11.421	5	79	0.173	15.533
08:00 - 09:00	5	79	0.112	10.051	5	79	0.221	19.873	5	79	0.333	29.924
09:00 - 10:00	5	79	0.112	10.051	5	79	0.102	9.137	5	79	0.214	19.188
10:00 - 11:00	5	79	0.109	9.822	5	79	0.117	10.508	5	79	0.226	20.330
11:00 - 12:00	5	79	0.122	10.964	5	79	0.102	9.137	5	79	0.224	20.101
12:00 - 13:00	5	79	0.096	8.680	5	79	0.114	10.279	5	79	0.210	18.959
13:00 - 14:00	5	79	0.117	10.508	5	79	0.086	7.766	5	79	0.203	18.274
14:00 - 15:00	5	79	0.089	7.995	5	79	0.129	11.650	5	79	0.218	19.645
15:00 - 16:00	5	79	0.152	13.706	5	79	0.104	9.365	5	79	0.256	23.071
16:00 - 17:00	5	79	0.127	11.421	5	79	0.132	11.878	5	79	0.259	23.299
17:00 - 18:00	5	79	0.185	16.675	5	79	0.145	13.020	5	79	0.330	29.695
18:00 - 19:00	5	79	0.124	11.193	5	79	0.069	6.168	5	79	0.193	17.361
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			1.391	125.178			1.448	130.202			2.839	255.380

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL CYCLISTS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.003	0.228	5	79	0.000	0.000	5	79	0.003	0.228
08:00 - 09:00	5	79	0.003	0.228	5	79	0.010	0.914	5	79	0.013	1.142
09:00 - 10:00	5	79	0.003	0.228	5	79	0.010	0.914	5	79	0.013	1.142
10:00 - 11:00	5	79	0.005	0.457	5	79	0.000	0.000	5	79	0.005	0.457
11:00 - 12:00	5	79	0.003	0.228	5	79	0.003	0.228	5	79	0.006	0.456
12:00 - 13:00	5	79	0.008	0.685	5	79	0.003	0.228	5	79	0.011	0.913
13:00 - 14:00	5	79	0.003	0.228	5	79	0.003	0.228	5	79	0.006	0.456
14:00 - 15:00	5	79	0.000	0.000	5	79	0.005	0.457	5	79	0.005	0.457
15:00 - 16:00	5	79	0.010	0.914	5	79	0.003	0.228	5	79	0.013	1.142
16:00 - 17:00	5	79	0.003	0.228	5	79	0.003	0.228	5	79	0.006	0.456
17:00 - 18:00	5	79	0.003	0.228	5	79	0.003	0.228	5	79	0.006	0.456
18:00 - 19:00	5	79	0.010	0.914	5	79	0.010	0.914	5	79	0.020	1.828
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.054	4.566			0.053	4.567			0.107	9.133

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.051	4.569	5	79	0.195	17.589	5	79	0.246	22.158
08:00 - 09:00	5	79	0.152	13.706	5	79	0.404	36.320	5	79	0.556	50.026
09:00 - 10:00	5	79	0.147	13.249	5	79	0.147	13.249	5	79	0.294	26.498
10:00 - 11:00	5	79	0.155	13.934	5	79	0.170	15.305	5	79	0.325	29.239
11:00 - 12:00	5	79	0.150	13.477	5	79	0.127	11.421	5	79	0.277	24.898
12:00 - 13:00	5	79	0.124	11.193	5	79	0.145	13.020	5	79	0.269	24.213
13:00 - 14:00	5	79	0.150	13.477	5	79	0.099	8.909	5	79	0.249	22.386
14:00 - 15:00	5	79	0.122	10.964	5	79	0.168	15.076	5	79	0.290	26.040
15:00 - 16:00	5	79	0.277	24.898	5	79	0.170	15.305	5	79	0.447	40.203
16:00 - 17:00	5	79	0.211	18.959	5	79	0.213	19.188	5	79	0.424	38.147
17:00 - 18:00	5	79	0.256	23.071	5	79	0.246	22.157	5	79	0.502	45.228
18:00 - 19:00	5	79	0.201	18.046	5	79	0.091	8.223	5	79	0.292	26.269
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			1.996	179.543			2.175	195.762			4.171	375.305

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.015	1.371	5	79	0.046	4.112	5	79	0.061	5.483
08:00 - 09:00	5	79	0.038	3.426	5	79	0.198	17.817	5	79	0.236	21.243
09:00 - 10:00	5	79	0.069	6.168	5	79	0.063	5.711	5	79	0.132	11.879
10:00 - 11:00	5	79	0.061	5.482	5	79	0.086	7.766	5	79	0.147	13.248
11:00 - 12:00	5	79	0.071	6.396	5	79	0.076	6.853	5	79	0.147	13.249
12:00 - 13:00	5	79	0.099	8.909	5	79	0.058	5.254	5	79	0.157	14.163
13:00 - 14:00	5	79	0.036	3.198	5	79	0.046	4.112	5	79	0.082	7.310
14:00 - 15:00	5	79	0.061	5.482	5	79	0.081	7.310	5	79	0.142	12.792
15:00 - 16:00	5	79	0.185	16.675	5	79	0.112	10.051	5	79	0.297	26.726
16:00 - 17:00	5	79	0.086	7.766	5	79	0.089	7.995	5	79	0.175	15.761
17:00 - 18:00	5	79	0.127	11.421	5	79	0.114	10.279	5	79	0.241	21.700
18:00 - 19:00	5	79	0.058	5.254	5	79	0.061	5.482	5	79	0.119	10.736
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.906	81.548			1.030	92.742			1.936	174.290

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.000	0.000	5	79	0.003	0.228	5	79	0.003	0.228
08:00 - 09:00	5	79	0.000	0.000	5	79	0.020	1.827	5	79	0.020	1.827
09:00 - 10:00	5	79	0.005	0.457	5	79	0.023	2.056	5	79	0.028	2.513
10:00 - 11:00	5	79	0.000	0.000	5	79	0.003	0.228	5	79	0.003	0.228
11:00 - 12:00	5	79	0.008	0.685	5	79	0.008	0.685	5	79	0.016	1.370
12:00 - 13:00	5	79	0.003	0.228	5	79	0.000	0.000	5	79	0.003	0.228
13:00 - 14:00	5	79	0.028	2.513	5	79	0.008	0.685	5	79	0.036	3.198
14:00 - 15:00	5	79	0.003	0.228	5	79	0.003	0.228	5	79	0.006	0.456
15:00 - 16:00	5	79	0.015	1.371	5	79	0.003	0.228	5	79	0.018	1.599
16:00 - 17:00	5	79	0.000	0.000	5	79	0.003	0.228	5	79	0.003	0.228
17:00 - 18:00	5	79	0.013	1.142	5	79	0.000	0.000	5	79	0.013	1.142
18:00 - 19:00	5	79	0.003	0.228	5	79	0.000	0.000	5	79	0.003	0.228
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.078	6.852			0.074	6.393			0.152	13.245

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 90 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	79	0.069	6.168	5	79	0.244	21.929	5	79	0.313	28.097
08:00 - 09:00	5	79	0.193	17.360	5	79	0.632	56.878	5	79	0.825	74.238
09:00 - 10:00	5	79	0.223	20.102	5	79	0.244	21.929	5	79	0.467	42.031
10:00 - 11:00	5	79	0.221	19.873	5	79	0.259	23.299	5	79	0.480	43.172
11:00 - 12:00	5	79	0.231	20.787	5	79	0.213	19.188	5	79	0.444	39.975
12:00 - 13:00	5	79	0.234	21.015	5	79	0.206	18.503	5	79	0.440	39.518
13:00 - 14:00	5	79	0.216	19.416	5	79	0.155	13.934	5	79	0.371	33.350
14:00 - 15:00	5	79	0.185	16.675	5	79	0.256	23.071	5	79	0.441	39.746
15:00 - 16:00	5	79	0.487	43.858	5	79	0.287	25.812	5	79	0.774	69.670
16:00 - 17:00	5	79	0.299	26.954	5	79	0.307	27.640	5	79	0.606	54.594
17:00 - 18:00	5	79	0.398	35.863	5	79	0.363	32.665	5	79	0.761	68.528
18:00 - 19:00	5	79	0.272	24.442	5	79	0.162	14.619	5	79	0.434	39.061
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			3.028	272.513			3.328	299.467			6.356	571.980

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	15 - 280 (units:)
Survey date date range:	01/01/07 - 19/09/13
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-700706-180717-0708

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	1 days
	KC	KENT	1 days
	SC	SURREY	1 days
	WS	WEST SUSSEX	1 days
03	SOUTH WEST		
	DC	DORSET	1 days
	DV	DEVON	2 days
	SM	SOMERSET	1 days
	WL	WILTSHIRE	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	2 days
	NF	NORFOLK	3 days
	SF	SUFFOLK	2 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	2 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	2 days
	ST	STAFFORDSHIRE	1 days
	WK	WARWICKSHIRE	2 days
	WM	WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	6 days
	SY	SOUTH YORKSHIRE	1 days
08	NORTH WEST		
	CH	CHESHIRE	2 days
	GM	GREATER MANCHESTER	1 days
	LC	LANCASHIRE	1 days
	MS	MERSEYSIDE	1 days
09	NORTH		
	CB	CUMBRIA	1 days
	DH	DURHAM	1 days
	TW	TYNE & WEAR	1 days
10	WALES		
	PS	POWYS	2 days
	VG	VALE OF GLAMORGAN	1 days
11	SCOTLAND		
	AG	ANGUS	1 days
	FA	FALKIRK	1 days
	HI	HIGHLAND	1 days
	PK	PERTH & KINROSS	1 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	1 days
	DO	DOWN	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	6 to 98 (units:)
Range Selected by User:	6 to 100 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 27/11/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	14 days
Tuesday	11 days
Wednesday	11 days
Thursday	8 days
Friday	5 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	49 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	7
Suburban Area (PPS6 Out of Centre)	27
Edge of Town	15

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	47
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C1	1 days
C3	47 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	6 days
5,001 to 10,000	11 days
10,001 to 15,000	10 days
15,001 to 20,000	10 days
20,001 to 25,000	4 days
25,001 to 50,000	8 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Secondary Filtering selection (Cont.):

Population within 5 miles:

5,001 to 25,000	6 days
25,001 to 50,000	7 days
50,001 to 75,000	5 days
75,001 to 100,000	11 days
100,001 to 125,000	2 days
125,001 to 250,000	10 days
250,001 to 500,000	7 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	16 days
1.1 to 1.5	32 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	3 days
No	46 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	49 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AG-03-A-01 BUNGALOWS/DET. ANGUS
KEPTIE ROAD

ARBROATH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 7
Survey date: TUESDAY *22/05/12* *Survey Type: MANUAL*

2 AN-03-A-07 SEMI DETACHED/TERRACED HOUSING ANTRIM
CASTLE WAY

ANTRIM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 55
Survey date: TUESDAY *20/12/11* *Survey Type: MANUAL*

3 CA-03-A-04 DETACHED CAMBRIDGESHIRE

THORPE PARK ROAD
PETERBOROUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 9
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

4 CA-03-A-05 DETACHED HOUSES CAMBRIDGESHIRE
EASTFIELD ROAD

PETERBOROUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 28
Survey date: MONDAY *17/10/16* *Survey Type: MANUAL*

5 CB-03-A-05 DETACHED/TERRACED HOUSING CUMBRIA
MACADAM WAY

PENRITH
Edge of Town Centre
Residential Zone
Total Number of dwellings: 50
Survey date: TUESDAY *21/06/16* *Survey Type: MANUAL*

6 CH-03-A-08 DETACHED CHESHIRE
WHITCHURCH ROAD
BOUGHTON HEATH
CHESTER
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 11
Survey date: TUESDAY *22/05/12* *Survey Type: MANUAL*

7 CH-03-A-09 TERRACED HOUSES CHESHIRE
GREYSTOKE ROAD
HURDSFIELD
MACCLESFIELD
Edge of Town
Residential Zone
Total Number of dwellings: 24
Survey date: MONDAY *24/11/14* *Survey Type: MANUAL*

8 DC-03-A-08 BUNGALOWS DORSET
HURSTDENE ROAD
CASTLE LANE WEST
BOURNEMOUTH
Edge of Town
Residential Zone
Total Number of dwellings: 28
Survey date: MONDAY *24/03/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9 DH-03-A-01 SEMI DETACHED DURHAM
GREENFIELDS ROAD

BISHOP AUCKLAND
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 50
Survey date: TUESDAY *28/03/17* *Survey Type: MANUAL*

10 DO-03-A-03 DETACHED/SEMI DETACHED DOWN
OLD MILL HEIGHTS
DUNDONALD
BELFAST
Edge of Town
Residential Zone
Total Number of dwellings: 79
Survey date: WEDNESDAY *23/10/13* *Survey Type: MANUAL*

11 DV-03-A-01 TERRACED HOUSES DEVON
BRONSHILL ROAD

TORQUAY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 37
Survey date: WEDNESDAY *30/09/15* *Survey Type: MANUAL*

12 DV-03-A-03 TERRACED & SEMI DETACHED DEVON
LOWER BRAND LANE

HONITON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 70
Survey date: MONDAY *28/09/15* *Survey Type: MANUAL*

13 ES-03-A-02 PRIVATE HOUSING EAST SUSSEX
SOUTH COAST ROAD

PEACEHAVEN
Edge of Town
Residential Zone
Total Number of dwellings: 37
Survey date: FRIDAY *18/11/11* *Survey Type: MANUAL*

14 FA-03-A-01 SEMI-DETACHED/TERRACED FALKIRK
MANDELA AVENUE

FALKIRK
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 37
Survey date: THURSDAY *30/05/13* *Survey Type: MANUAL*

15 GM-03-A-10 DETACHED/SEMI GREATER MANCHESTER
BUTT HILL DRIVE
PRESTWICH
MANCHESTER
Edge of Town
Residential Zone
Total Number of dwellings: 29
Survey date: WEDNESDAY *12/10/11* *Survey Type: MANUAL*

16 HC-03-A-19 HOUSES & FLATS HAMPSHIRE
CANADA WAY

LIPHOOK
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 62
Survey date: MONDAY *27/11/17* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

17 HI-03-A-14 SEMI-DETACHED & TERRACED HIGHLAND
KING BRUDE ROAD
SCORGUIE
INVERNESS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 40
Survey date: WEDNESDAY 23/03/16 Survey Type: MANUAL

18 KC-03-A-03 MIXED HOUSES & FLATS KENT
HYTHE ROAD
WILLESBOROUGH
ASHFORD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 51
Survey date: THURSDAY 14/07/16 Survey Type: MANUAL

19 LC-03-A-30 SEMI-DETACHED LANCASHIRE
WATSON ROAD

BLACKPOOL
Edge of Town Centre
Residential Zone
Total Number of dwellings: 24
Survey date: FRIDAY 14/06/13 Survey Type: MANUAL

20 LN-03-A-03 SEMI DETACHED LINCOLNSHIRE
ROOKERY LANE
BOULTHAM
LINCOLN
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 22
Survey date: TUESDAY 18/09/12 Survey Type: MANUAL

21 LN-03-A-04 DETACHED & SEMI-DETACHED LINCOLNSHIRE
EGERTON ROAD

LINCOLN
Edge of Town Centre
Residential Zone
Total Number of dwellings: 30
Survey date: MONDAY 29/06/15 Survey Type: MANUAL

22 MS-03-A-03 DETACHED MERSEYSIDE
BEMPTON ROAD
OTTERSPOOL
LIVERPOOL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 15
Survey date: FRIDAY 21/06/13 Survey Type: MANUAL

23 NF-03-A-01 SEMI DET. & BUNGALOWS NORFOLK
YARMOUTH ROAD

CAISTER-ON-SEA
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 27
Survey date: TUESDAY 16/10/12 Survey Type: MANUAL

24 NF-03-A-02 HOUSES & FLATS NORFOLK
DEREHAM ROAD

NORWICH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 98
Survey date: MONDAY 22/10/12 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

25 NF-03-A-03 DETACHED HOUSES NORFOLK
HALING WAY

THETFORD
Edge of Town
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *16/09/15* *Survey Type: MANUAL*

26 NY-03-A-08 TERRACED HOUSES NORTH YORKSHIRE
NICHOLAS STREET

YORK
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 21
Survey date: MONDAY *16/09/13* *Survey Type: MANUAL*

27 NY-03-A-09 MIXED HOUSING NORTH YORKSHIRE
GRAMMAR SCHOOL LANE

NORTHALLERTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 52
Survey date: MONDAY *16/09/13* *Survey Type: MANUAL*

28 NY-03-A-10 HOUSES AND FLATS NORTH YORKSHIRE
BOROUGHBRIDGE ROAD

RIPON
Edge of Town
No Sub Category
Total Number of dwellings: 71
Survey date: TUESDAY *17/09/13* *Survey Type: MANUAL*

29 NY-03-A-11 PRIVATE HOUSING NORTH YORKSHIRE
HORSEFAIR

BOROUGHBRIDGE
Edge of Town
Residential Zone
Total Number of dwellings: 23
Survey date: WEDNESDAY *18/09/13* *Survey Type: MANUAL*

30 NY-03-A-12 TOWN HOUSES NORTH YORKSHIRE
RACECOURSE LANE

NORTHALLERTON
Edge of Town Centre
Residential Zone
Total Number of dwellings: 47
Survey date: TUESDAY *27/09/16* *Survey Type: MANUAL*

31 NY-03-A-13 TERRACED HOUSES NORTH YORKSHIRE
CATTERICK ROAD
OLD HOSPITAL COMPOUND
CATTERICK GARRISON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 10
Survey date: WEDNESDAY *10/05/17* *Survey Type: MANUAL*

32 PK-03-A-01 DETAC. & BUNGALOWS PERTH & KINROSS
TULLYLUMB TERRACE
GORNHILL
PERTH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 36
Survey date: WEDNESDAY *11/05/11* *Survey Type: MANUAL*

33 PS-03-A-01 MIXED HOUSES POWYS
BRYN GLAS

WELSHPOOL
Edge of Town Centre
Residential Zone
Total Number of dwellings: 16
Survey date: MONDAY *11/05/15* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

34 PS-03-A-02 DETACHED/SEMI-DETACHED POWYS
GUNROG ROAD

WELSHPOOL
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 28
Survey date: MONDAY *11/05/15* *Survey Type: MANUAL*

35 SC-03-A-04 DETACHED & TERRACED SURREY
HIGH ROAD

BYFLEET
Edge of Town
Residential Zone
Total Number of dwellings: 71
Survey date: THURSDAY *23/01/14* *Survey Type: MANUAL*

36 SF-03-A-04 DETACHED & BUNGALOWS SUFFOLK
NORMANSTON DRIVE

LOWESTOFT
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 7
Survey date: TUESDAY *23/10/12* *Survey Type: MANUAL*

37 SF-03-A-05 DETACHED HOUSES SUFFOLK
VALE LANE

BURY ST EDMUNDS
Edge of Town
Residential Zone
Total Number of dwellings: 18
Survey date: WEDNESDAY *09/09/15* *Survey Type: MANUAL*

38 SH-03-A-05 SEMI-DETACHED/TERRACED SHROPSHIRE
SANDCROFT
SUTTON HILL
TELFORD
Edge of Town
Residential Zone
Total Number of dwellings: 54
Survey date: THURSDAY *24/10/13* *Survey Type: MANUAL*

39 SH-03-A-06 BUNGALOWS SHROPSHIRE
ELLESMERE ROAD

SHREWSBURY
Edge of Town
Residential Zone
Total Number of dwellings: 16
Survey date: THURSDAY *22/05/14* *Survey Type: MANUAL*

40 SM-03-A-01 DETACHED & SEMI SOMERSET
WEMBDON ROAD
NORTHFIELD
BRIDGWATER
Edge of Town
Residential Zone
Total Number of dwellings: 33
Survey date: THURSDAY *24/09/15* *Survey Type: MANUAL*

41 ST-03-A-06 SEMI-DET. & TERRACED STAFFORDSHIRE
STANFORD ROAD
BLAKENHALL
WOLVERHAMPTON
Edge of Town Centre
No Sub Category
Total Number of dwellings: 17
Survey date: FRIDAY *09/05/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

42 SY-03-A-01 SEMI DETACHED HOUSES SOUTH YORKSHIRE
A19 BENTLEY ROAD
BENTLEY RISE
DONCASTER
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 54
Survey date: WEDNESDAY 18/09/13 Survey Type: MANUAL

43 TW-03-A-02 SEMI-DETACHED TYNE & WEAR
WEST PARK ROAD

GATESHEAD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 16
Survey date: MONDAY 07/10/13 Survey Type: MANUAL

44 VG-03-A-01 SEMI-DETACHED & TERRACED VALE OF GLAMORGAN
ARTHUR STREET

BARRY
Edge of Town
Residential Zone
Total Number of dwellings: 12
Survey date: MONDAY 08/05/17 Survey Type: MANUAL

45 WK-03-A-01 TERRACED/SEMI/DET. WARWICKSHIRE
ARLINGTON AVENUE

LEAMINGTON SPA
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 6
Survey date: FRIDAY 21/10/11 Survey Type: MANUAL

46 WK-03-A-02 BUNGALOWS WARWICKSHIRE
NARBERTH WAY
POTTERS GREEN
COVENTRY
Edge of Town
Residential Zone
Total Number of dwellings: 17
Survey date: THURSDAY 17/10/13 Survey Type: MANUAL

47 WL-03-A-02 SEMI DETACHED WILTSHIRE
HEADLANDS GROVE

SWINDON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 27
Survey date: THURSDAY 22/09/16 Survey Type: MANUAL

48 WM-03-A-05 TERRACED & DETACHED WEST MIDLANDS
COUNDON ROAD

COVENTRY
Edge of Town Centre
Residential Zone
Total Number of dwellings: 89
Survey date: MONDAY 21/11/16 Survey Type: MANUAL

49 WS-03-A-05 TERRACED & FLATS WEST SUSSEX
UPPER SHOREHAM ROAD

SHOREHAM BY SEA
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 48
Survey date: WEDNESDAY 18/04/12 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.077	2.304	49	35	0.284	8.534	49	35	0.361	10.838
08:00 - 09:00	49	35	0.160	4.799	49	35	0.401	12.024	49	35	0.561	16.823
09:00 - 10:00	49	35	0.154	4.625	49	35	0.184	5.515	49	35	0.338	10.140
10:00 - 11:00	49	35	0.130	3.909	49	35	0.136	4.066	49	35	0.266	7.975
11:00 - 12:00	49	35	0.156	4.677	49	35	0.168	5.044	49	35	0.324	9.721
12:00 - 13:00	49	35	0.168	5.044	49	35	0.168	5.026	49	35	0.336	10.070
13:00 - 14:00	49	35	0.169	5.061	49	35	0.173	5.201	49	35	0.342	10.262
14:00 - 15:00	49	35	0.159	4.764	49	35	0.191	5.724	49	35	0.350	10.488
15:00 - 16:00	49	35	0.239	7.155	49	35	0.175	5.236	49	35	0.414	12.391
16:00 - 17:00	49	35	0.298	8.935	49	35	0.184	5.515	49	35	0.482	14.450
17:00 - 18:00	49	35	0.350	10.506	49	35	0.169	5.079	49	35	0.519	15.585
18:00 - 19:00	49	35	0.234	7.016	49	35	0.151	4.520	49	35	0.385	11.536
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			2.294	68.795			2.384	71.484			4.678	140.279

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL CYCLISTS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.006	0.192	49	35	0.023	0.698	49	35	0.029	0.890
08:00 - 09:00	49	35	0.001	0.035	49	35	0.023	0.698	49	35	0.024	0.733
09:00 - 10:00	49	35	0.002	0.052	49	35	0.008	0.227	49	35	0.010	0.279
10:00 - 11:00	49	35	0.004	0.122	49	35	0.009	0.279	49	35	0.013	0.401
11:00 - 12:00	49	35	0.003	0.087	49	35	0.004	0.122	49	35	0.007	0.209
12:00 - 13:00	49	35	0.006	0.192	49	35	0.005	0.157	49	35	0.011	0.349
13:00 - 14:00	49	35	0.007	0.209	49	35	0.002	0.070	49	35	0.009	0.279
14:00 - 15:00	49	35	0.005	0.140	49	35	0.006	0.192	49	35	0.011	0.332
15:00 - 16:00	49	35	0.021	0.628	49	35	0.003	0.087	49	35	0.024	0.715
16:00 - 17:00	49	35	0.019	0.558	49	35	0.005	0.140	49	35	0.024	0.698
17:00 - 18:00	49	35	0.022	0.646	49	35	0.007	0.209	49	35	0.029	0.855
18:00 - 19:00	49	35	0.009	0.262	49	35	0.006	0.192	49	35	0.015	0.454
19:00 - 20:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
20:00 - 21:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
21:00 - 22:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.105	3.123			0.101	3.071			0.206	6.194

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.092	2.775	49	35	0.354	10.628	49	35	0.446	13.403
08:00 - 09:00	49	35	0.204	6.108	49	35	0.584	17.522	49	35	0.788	23.630
09:00 - 10:00	49	35	0.183	5.497	49	35	0.239	7.173	49	35	0.422	12.670
10:00 - 11:00	49	35	0.162	4.852	49	35	0.180	5.393	49	35	0.342	10.245
11:00 - 12:00	49	35	0.192	5.759	49	35	0.207	6.195	49	35	0.399	11.954
12:00 - 13:00	49	35	0.211	6.335	49	35	0.212	6.353	49	35	0.423	12.688
13:00 - 14:00	49	35	0.201	6.038	49	35	0.222	6.649	49	35	0.423	12.687
14:00 - 15:00	49	35	0.205	6.143	49	35	0.236	7.068	49	35	0.441	13.211
15:00 - 16:00	49	35	0.372	11.152	49	35	0.230	6.894	49	35	0.602	18.046
16:00 - 17:00	49	35	0.418	12.548	49	35	0.248	7.452	49	35	0.666	20.000
17:00 - 18:00	49	35	0.480	14.398	49	35	0.223	6.684	49	35	0.703	21.082
18:00 - 19:00	49	35	0.307	9.197	49	35	0.203	6.091	49	35	0.510	15.288
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			3.027	90.802			3.138	94.102			6.165	184.904

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.024	0.716	49	35	0.069	2.059	49	35	0.093	2.775
08:00 - 09:00	49	35	0.058	1.728	49	35	0.193	5.777	49	35	0.251	7.505
09:00 - 10:00	49	35	0.048	1.449	49	35	0.067	2.007	49	35	0.115	3.456
10:00 - 11:00	49	35	0.045	1.361	49	35	0.066	1.990	49	35	0.111	3.351
11:00 - 12:00	49	35	0.054	1.606	49	35	0.048	1.431	49	35	0.102	3.037
12:00 - 13:00	49	35	0.056	1.693	49	35	0.049	1.483	49	35	0.105	3.176
13:00 - 14:00	49	35	0.056	1.675	49	35	0.060	1.798	49	35	0.116	3.473
14:00 - 15:00	49	35	0.058	1.728	49	35	0.056	1.693	49	35	0.114	3.421
15:00 - 16:00	49	35	0.156	4.677	49	35	0.090	2.705	49	35	0.246	7.382
16:00 - 17:00	49	35	0.114	3.421	49	35	0.066	1.990	49	35	0.180	5.411
17:00 - 18:00	49	35	0.112	3.351	49	35	0.064	1.920	49	35	0.176	5.271
18:00 - 19:00	49	35	0.068	2.042	49	35	0.045	1.344	49	35	0.113	3.386
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.849	25.447			0.873	26.197			1.722	51.644

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.003	0.087	49	35	0.026	0.785	49	35	0.029	0.872
08:00 - 09:00	49	35	0.002	0.052	49	35	0.022	0.646	49	35	0.024	0.698
09:00 - 10:00	49	35	0.002	0.070	49	35	0.010	0.297	49	35	0.012	0.367
10:00 - 11:00	49	35	0.008	0.244	49	35	0.008	0.244	49	35	0.016	0.488
11:00 - 12:00	49	35	0.006	0.175	49	35	0.008	0.244	49	35	0.014	0.419
12:00 - 13:00	49	35	0.010	0.314	49	35	0.010	0.314	49	35	0.020	0.628
13:00 - 14:00	49	35	0.006	0.175	49	35	0.002	0.070	49	35	0.008	0.245
14:00 - 15:00	49	35	0.010	0.297	49	35	0.007	0.209	49	35	0.017	0.506
15:00 - 16:00	49	35	0.012	0.349	49	35	0.006	0.192	49	35	0.018	0.541
16:00 - 17:00	49	35	0.016	0.471	49	35	0.006	0.192	49	35	0.022	0.663
17:00 - 18:00	49	35	0.018	0.541	49	35	0.005	0.157	49	35	0.023	0.698
18:00 - 19:00	49	35	0.017	0.524	49	35	0.001	0.035	49	35	0.018	0.559
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.110	3.299			0.111	3.385			0.221	6.684

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 30 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	49	35	0.126	3.770	49	35	0.472	14.171	49	35	0.598	17.941
08:00 - 09:00	49	35	0.264	7.923	49	35	0.821	24.642	49	35	1.085	32.565
09:00 - 10:00	49	35	0.236	7.068	49	35	0.323	9.703	49	35	0.559	16.771
10:00 - 11:00	49	35	0.219	6.579	49	35	0.264	7.906	49	35	0.483	14.485
11:00 - 12:00	49	35	0.254	7.627	49	35	0.266	7.993	49	35	0.520	15.620
12:00 - 13:00	49	35	0.284	8.534	49	35	0.277	8.307	49	35	0.561	16.841
13:00 - 14:00	49	35	0.270	8.098	49	35	0.286	8.586	49	35	0.556	16.684
14:00 - 15:00	49	35	0.277	8.307	49	35	0.305	9.162	49	35	0.582	17.469
15:00 - 16:00	49	35	0.560	16.806	49	35	0.329	9.878	49	35	0.889	26.684
16:00 - 17:00	49	35	0.567	16.998	49	35	0.326	9.773	49	35	0.893	26.771
17:00 - 18:00	49	35	0.631	18.935	49	35	0.299	8.970	49	35	0.930	27.905
18:00 - 19:00	49	35	0.401	12.024	49	35	0.255	7.661	49	35	0.656	19.685
19:00 - 20:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
20:00 - 21:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
21:00 - 22:00	1	7	0.000	0.000	1	7	0.000	0.000	1	7	0.000	0.000
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			4.089	122.669			4.223	126.752			8.312	249.421

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Parameter summary

Trip rate parameter range selected:	6 - 98 (units:)
Survey date date range:	01/01/10 - 27/11/17
Number of weekdays (Monday-Friday):	49
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX C

Network Diagrams

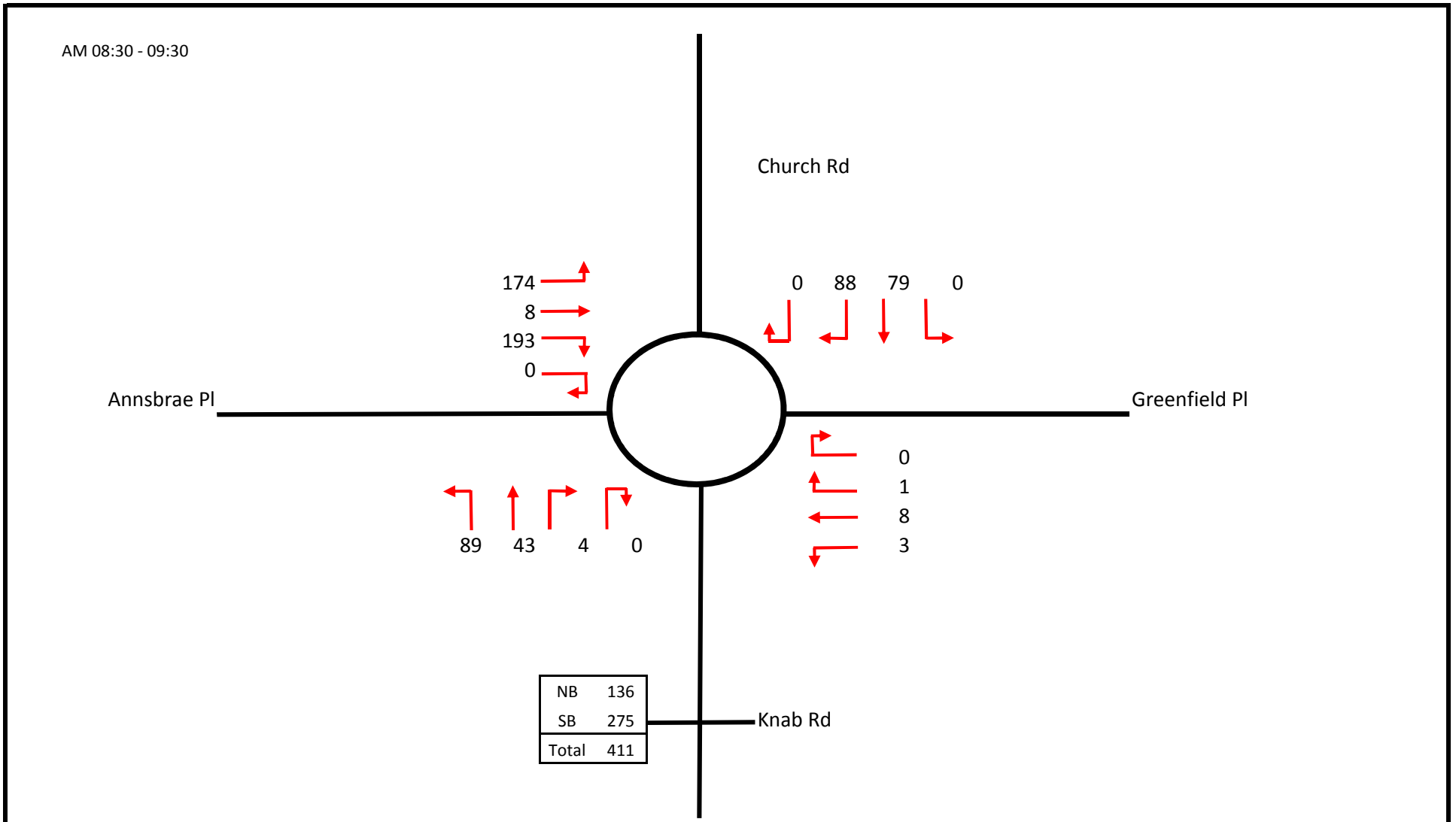


Figure C1

2008 AM Base

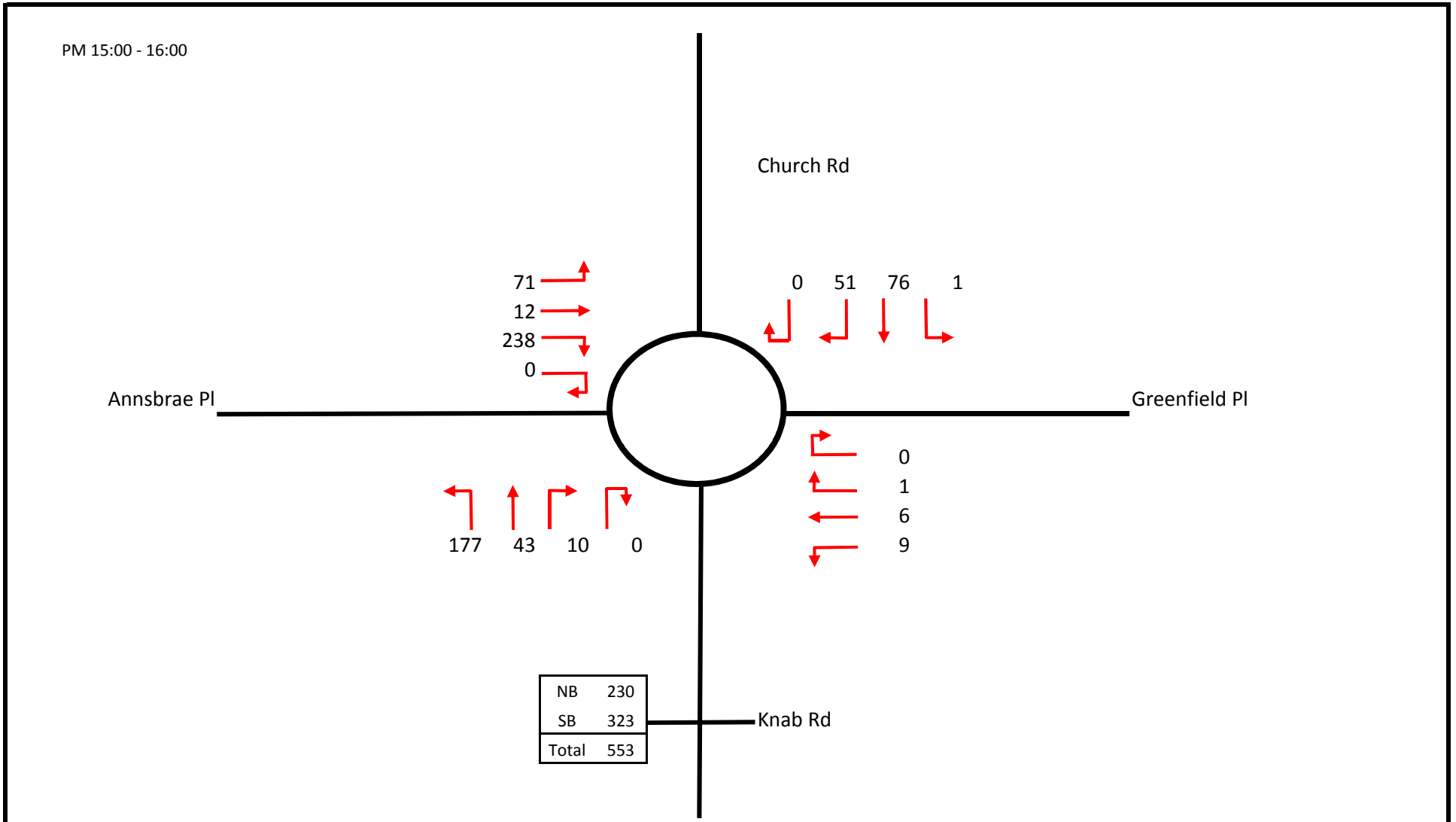


Figure C2

2008 PM Base

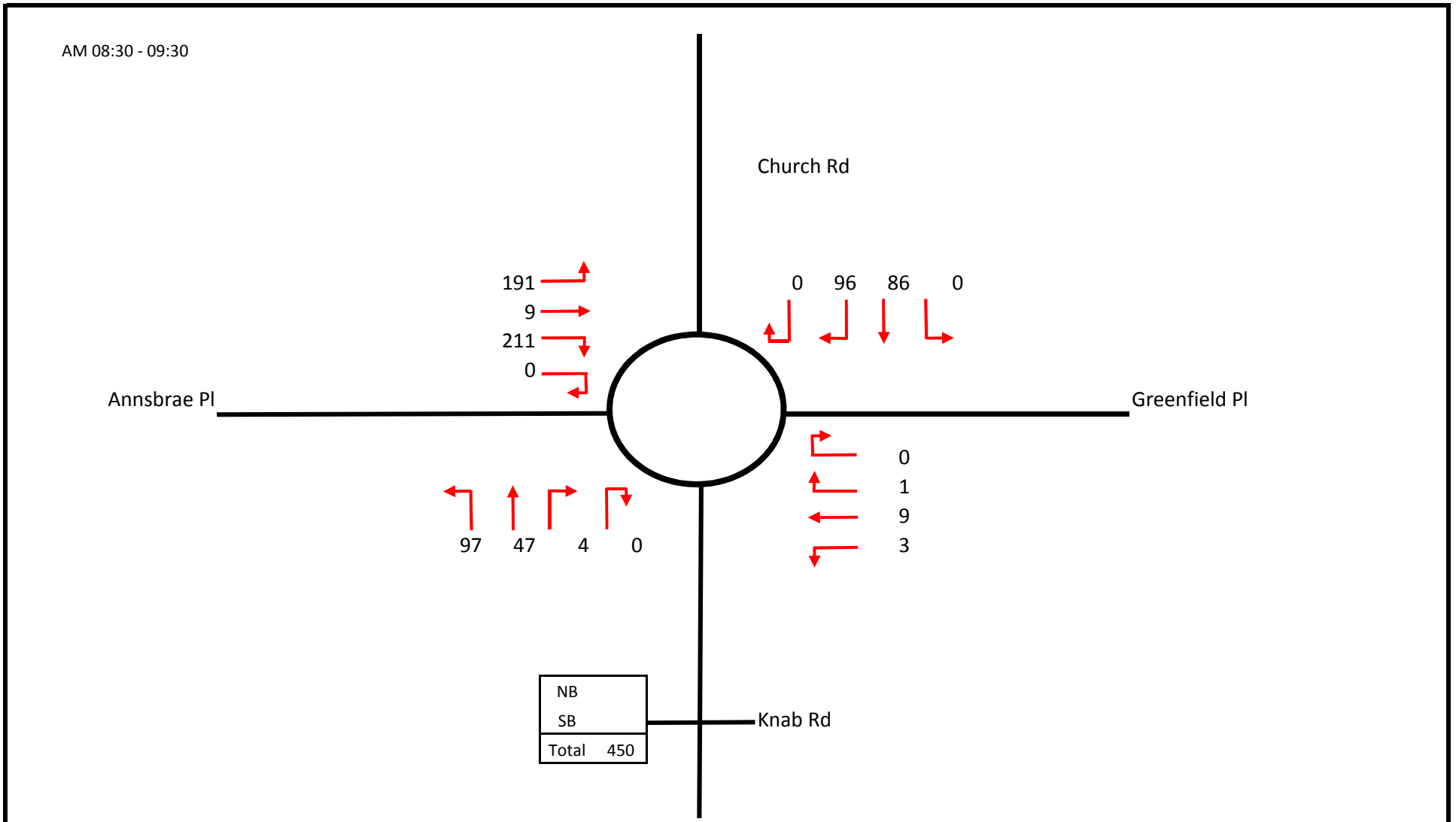


Figure C3

2017 AM Factored

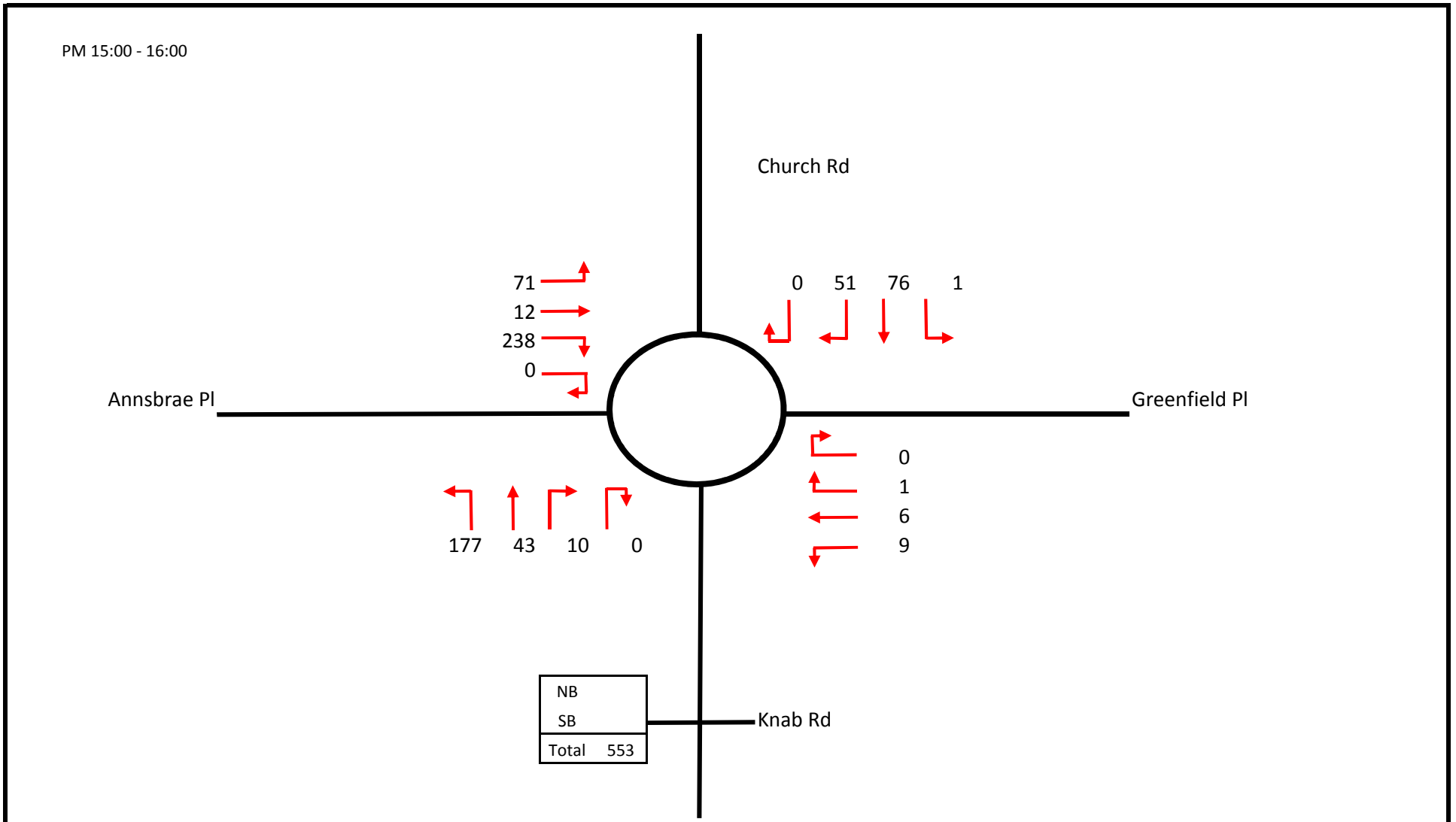


Figure C4

2017 PM Factored

NRTF Low Growth
1.024

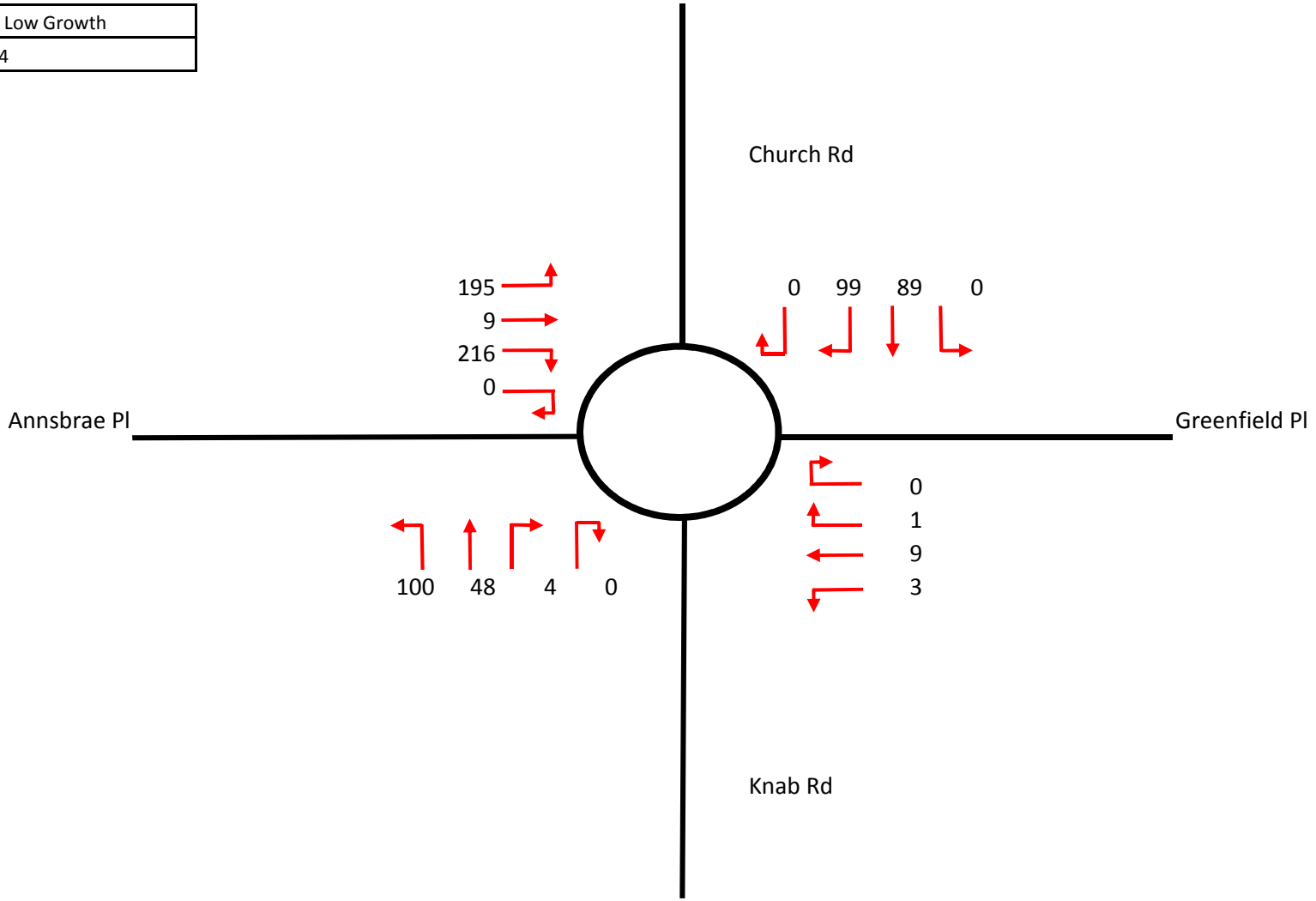


Figure C5

2020 AM Projected

NRTF Low Growth
1.024

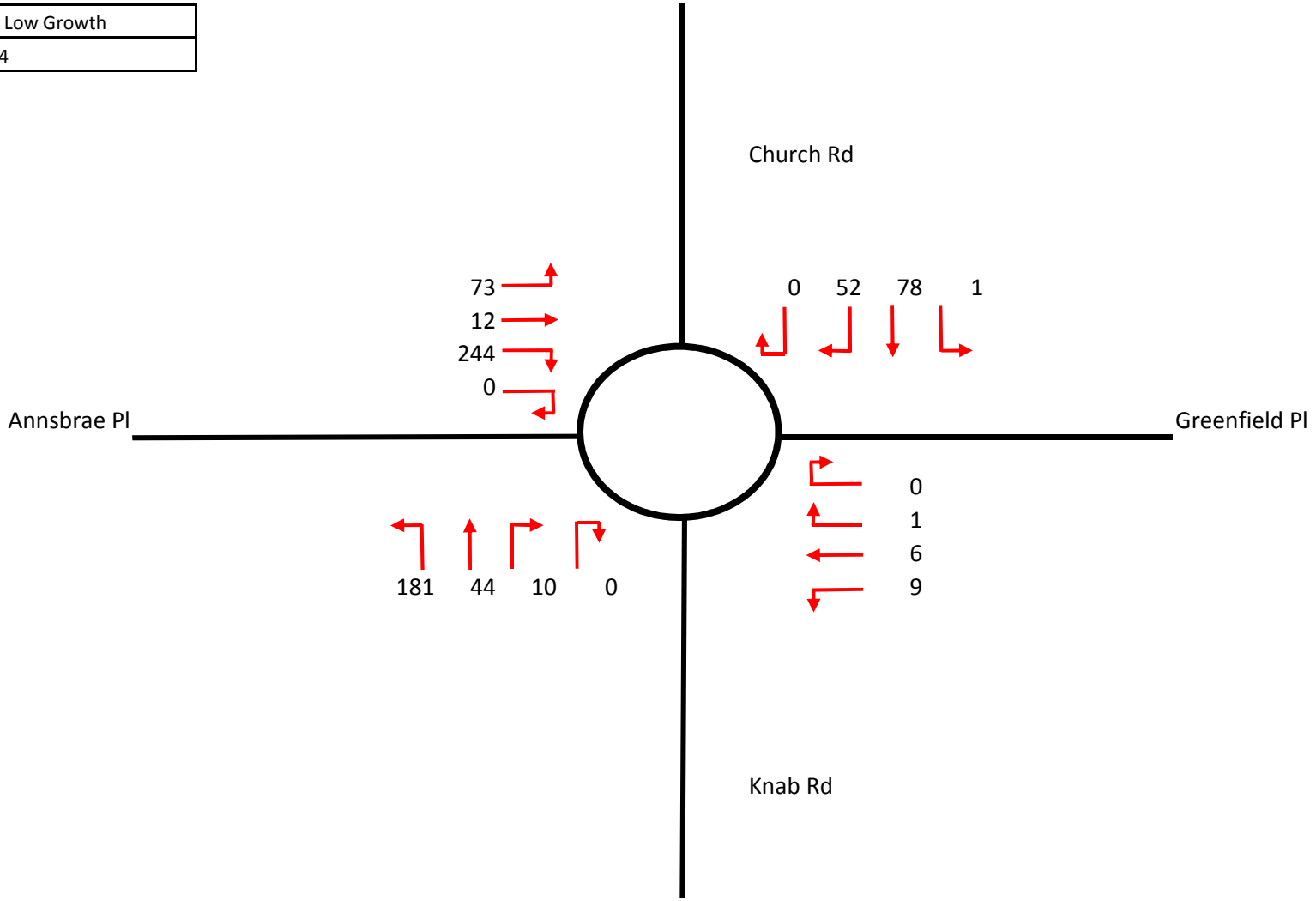


Figure C6

2020 PM Projected

NRTF Low Growth
1.060

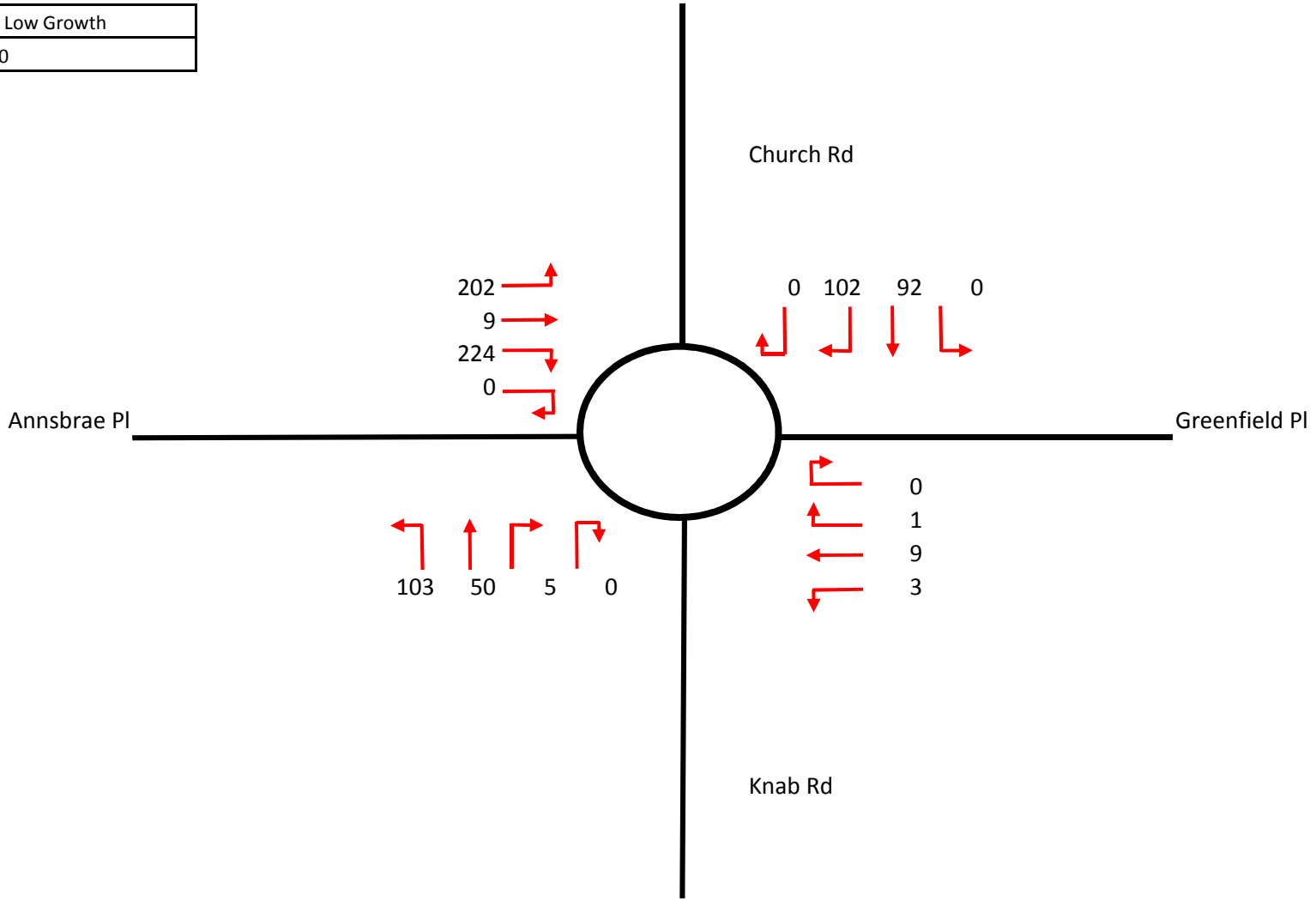


Figure C7

2026 AM Projected

NRTF Low Growth
1.060

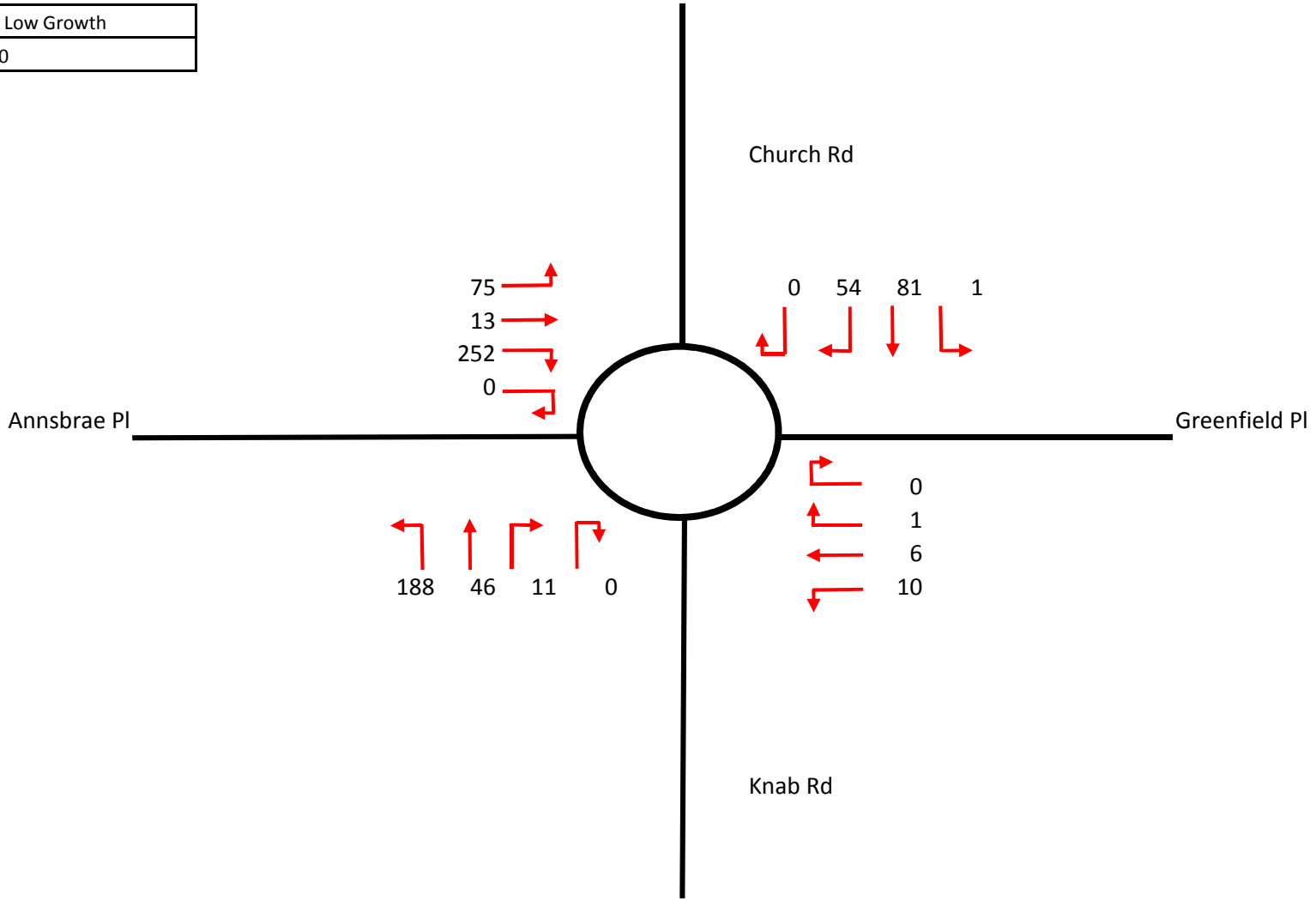


Figure C8

2026 PM Projected

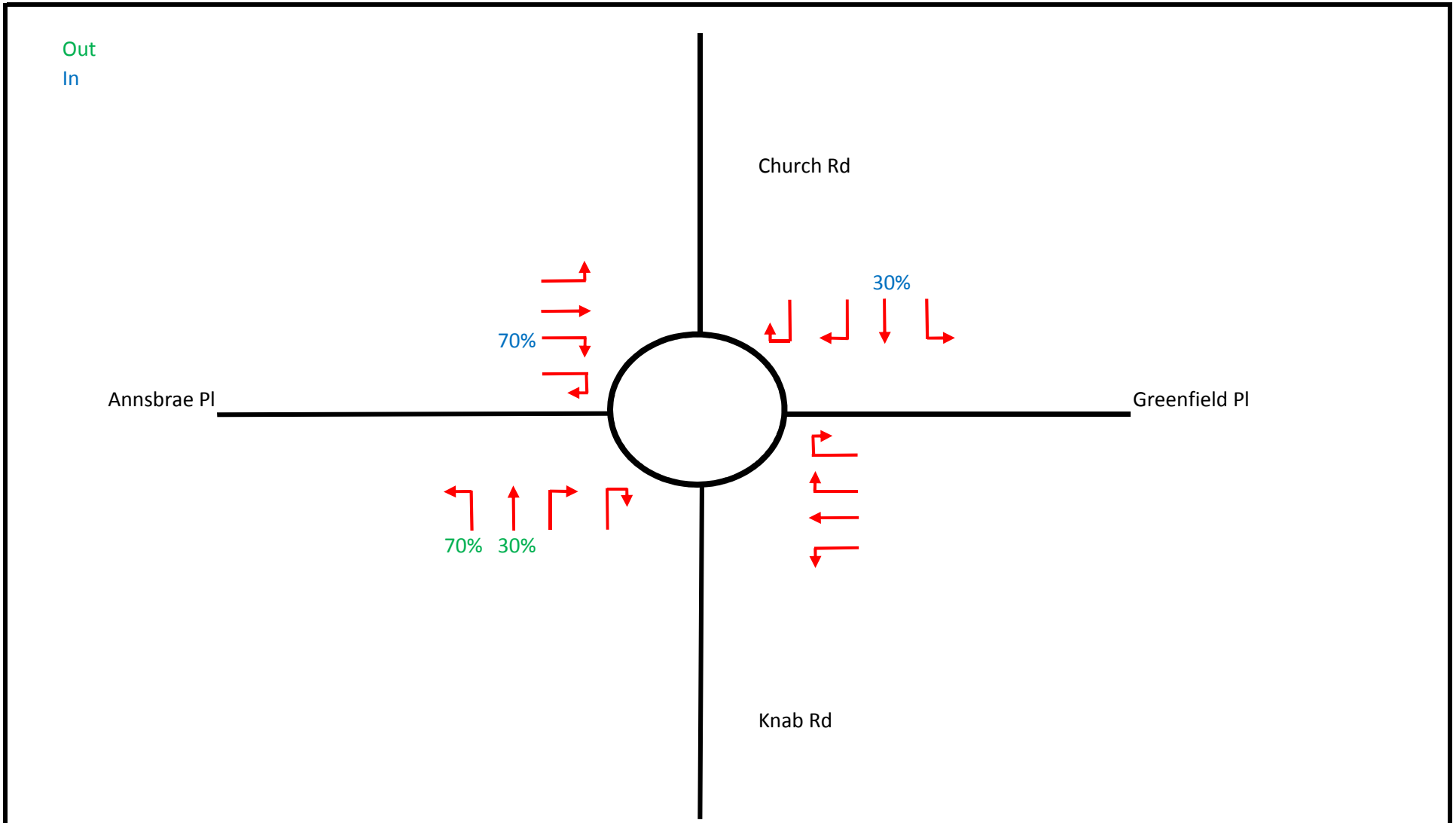


Figure C9

Resi Distribution

229 vehicle trips

In	Out
26%	74%
60	169

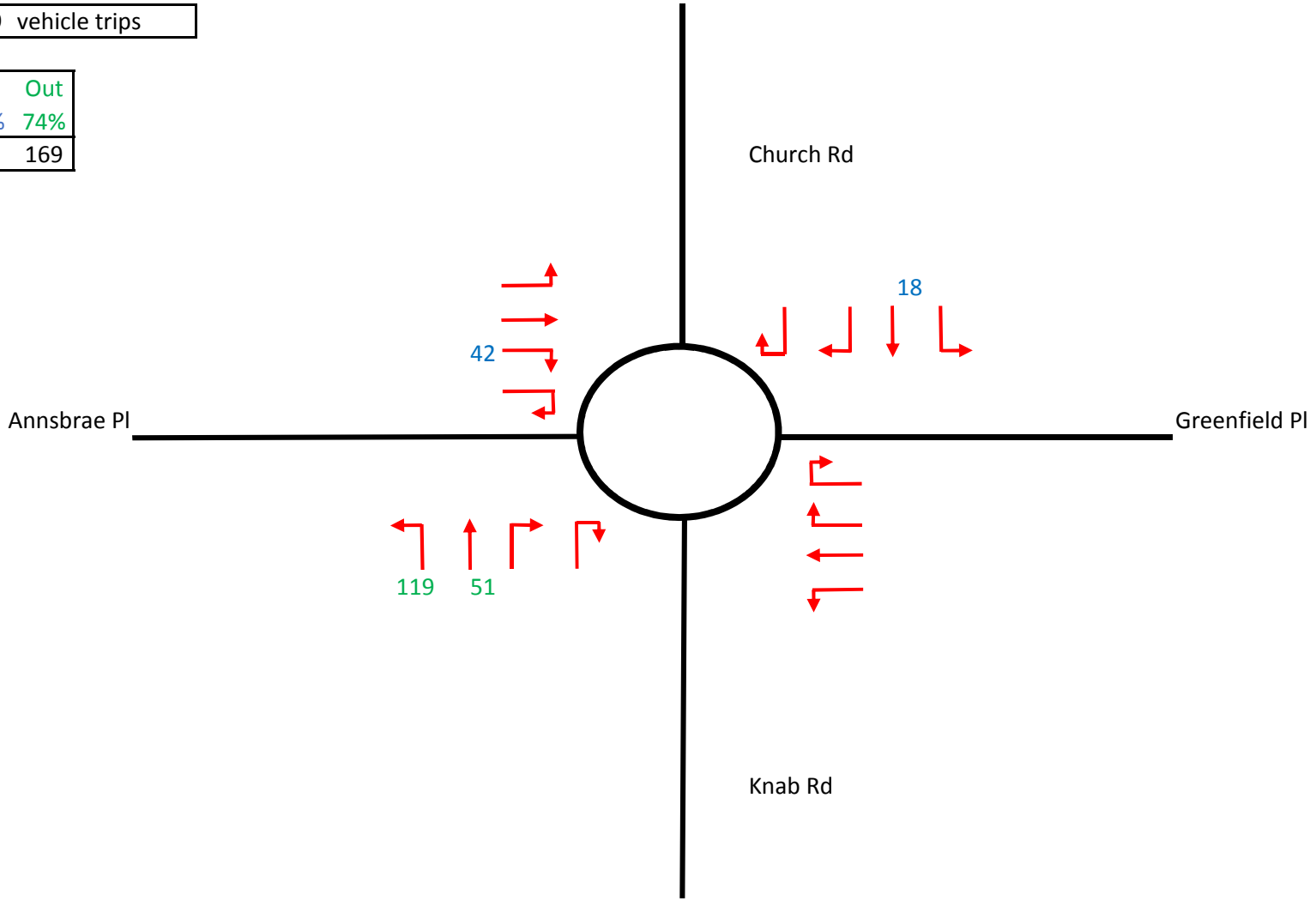


Figure C10

Dev Resi Trips AM

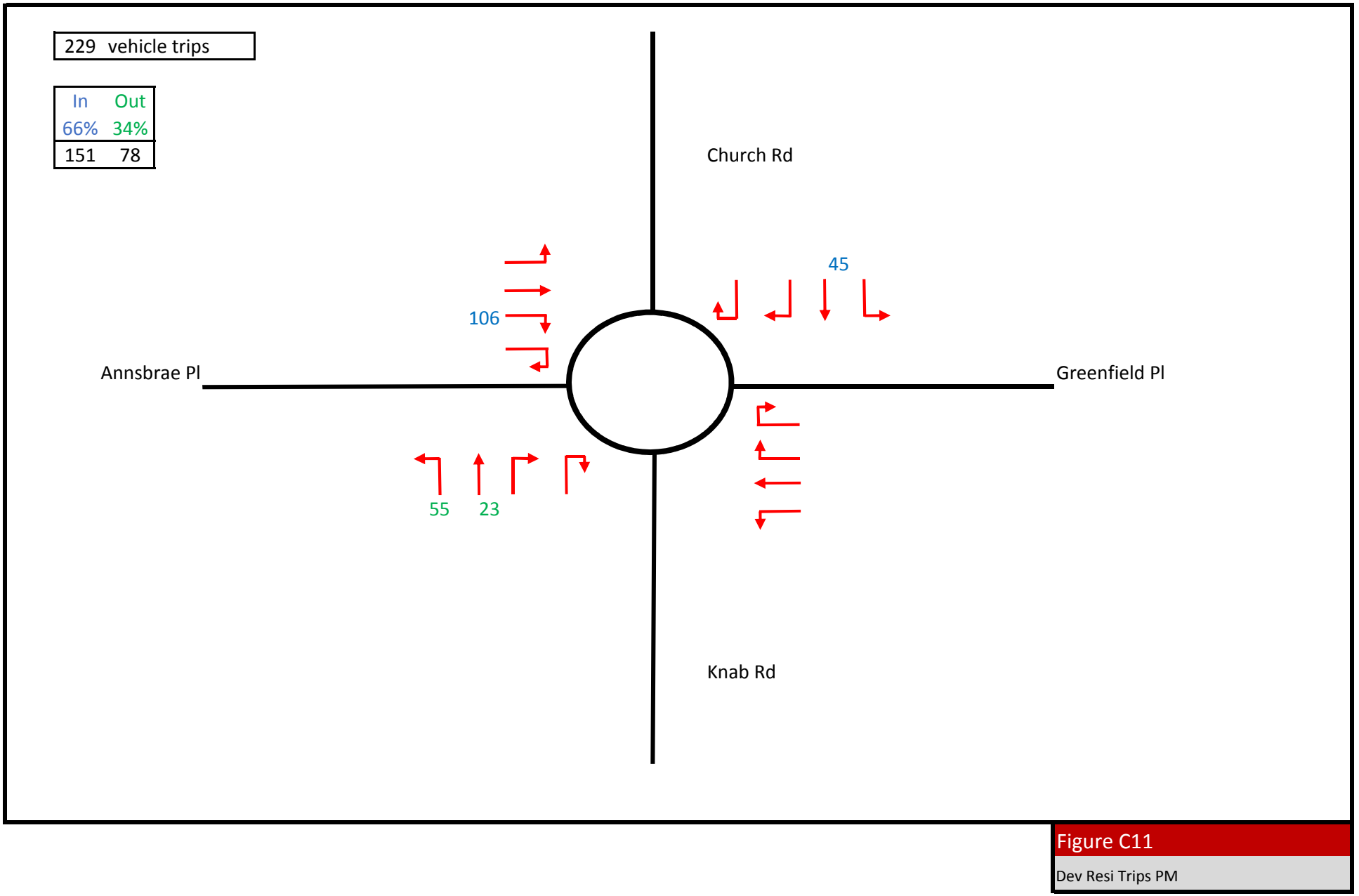


Figure C11

Dev Resi Trips PM

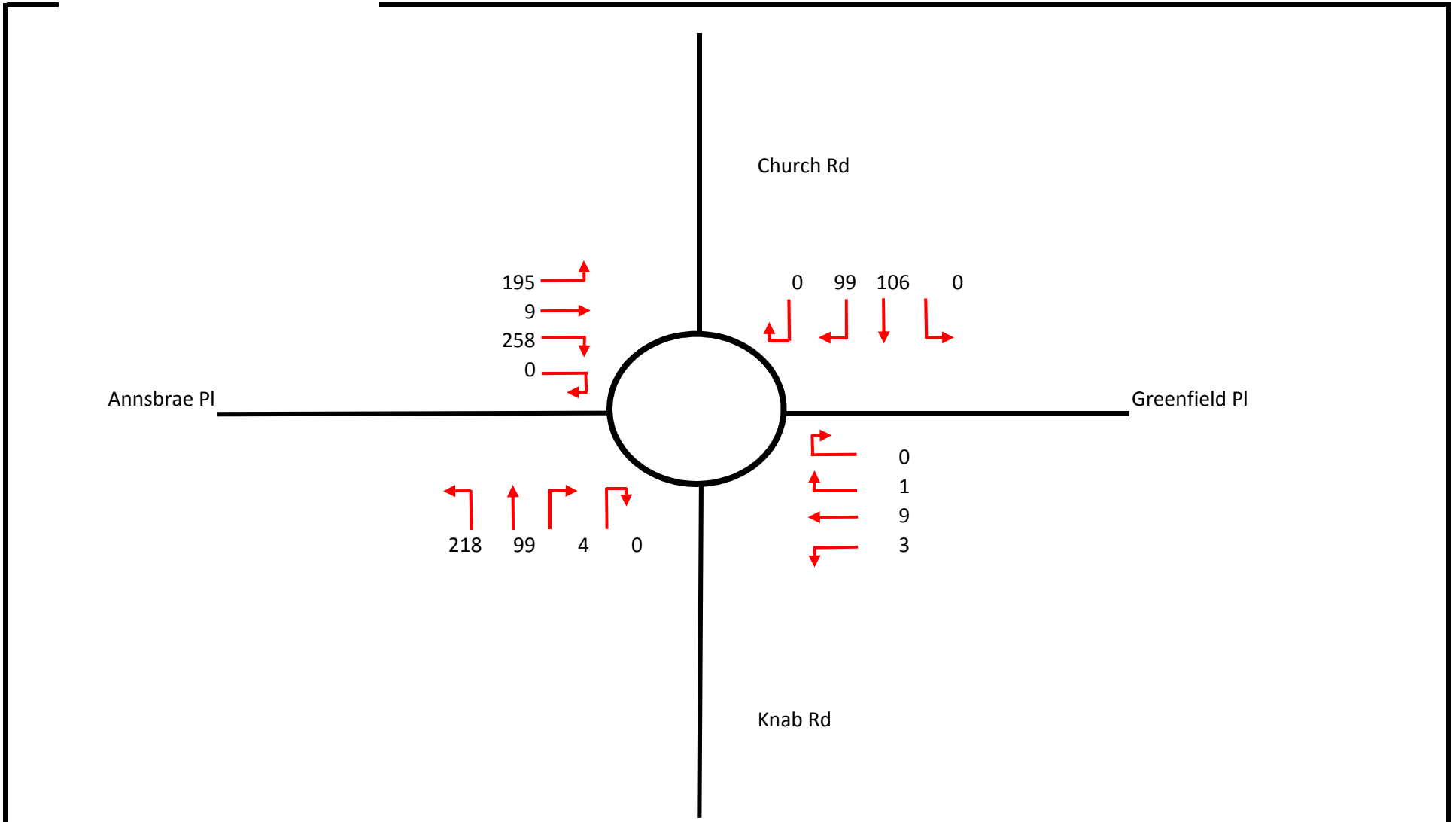


Figure C12

2020 AM Base + Dev

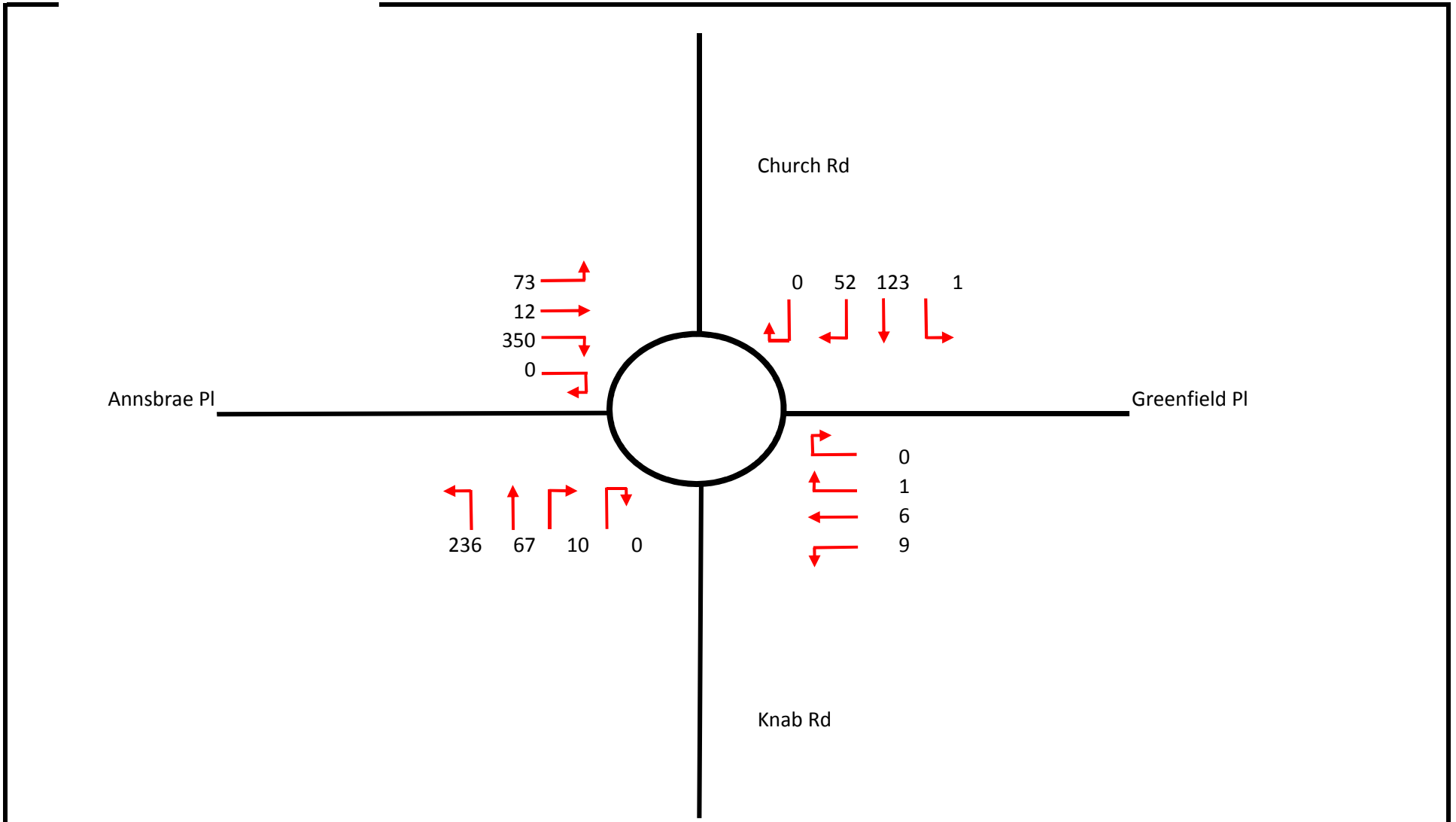


Figure C13

2020 PM Base + Dev

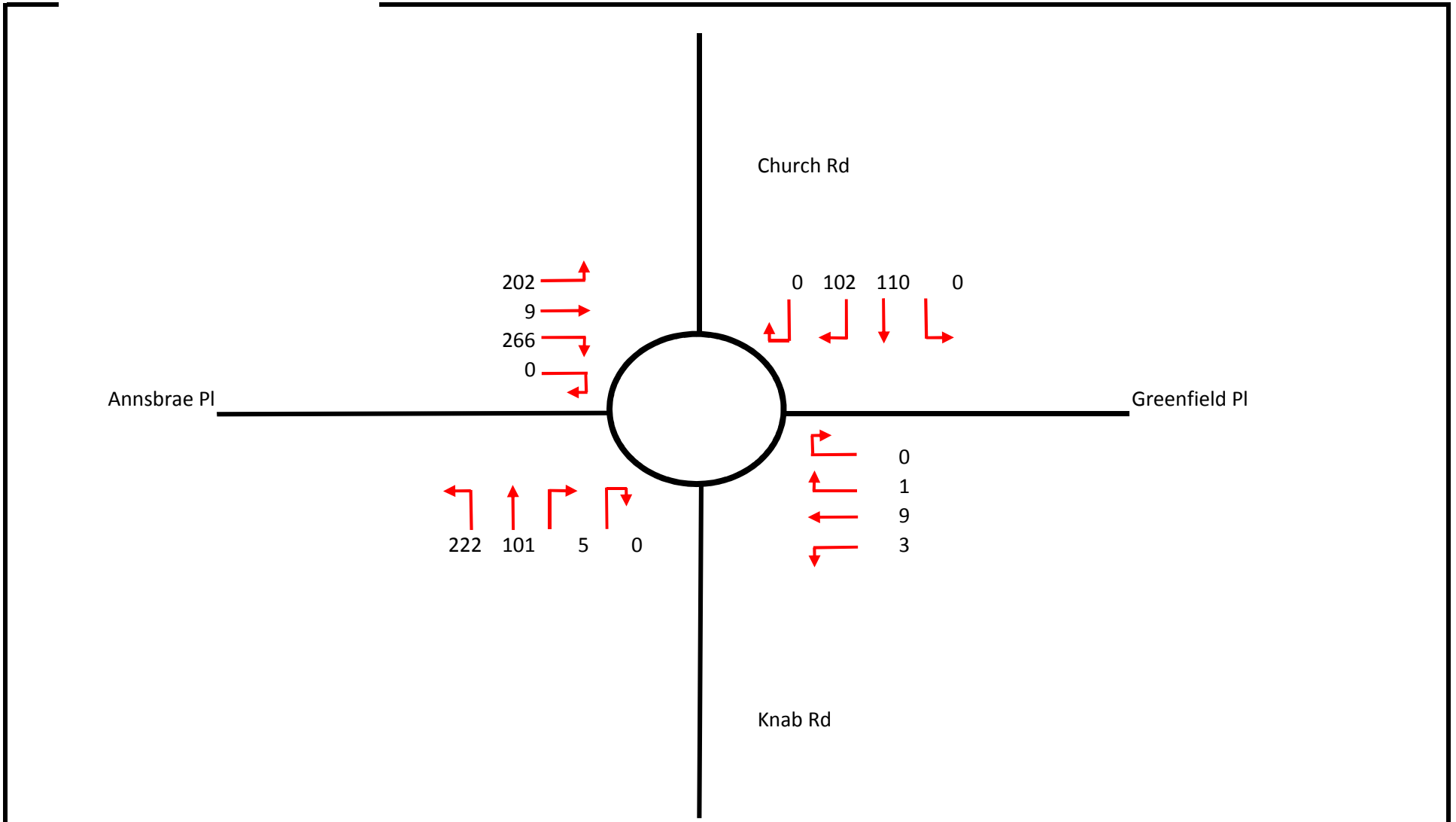


Figure C14

2026 AM Base + Dev

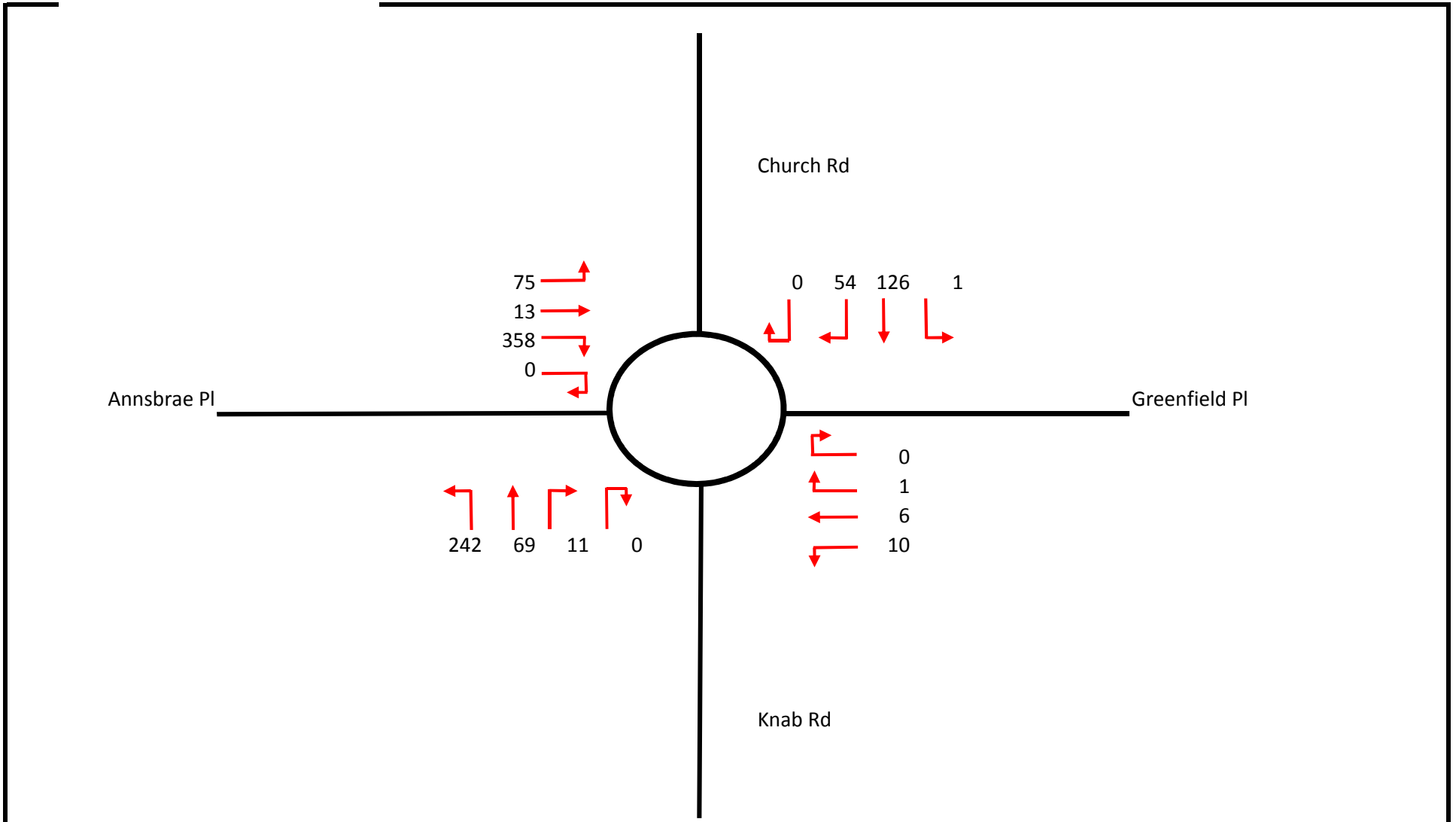


Figure C15

2026 PM Base + Dev

APPENDIX D

ARCADY Output Files

Run Information

Run with file:- **u:\SCT\2017\T&T\106459 - Knab Masterplan\CALCULATIONS\TRAFFIC\ARCADY\Knab Masterplan - Roundabout Junction AM.vai**
At: **10:10:38 on Friday, February 15, 2019**
Mode: **Drive On The Left**
Units: **Metric**

Arm Labelling

Arm	Full Arm Names
Arm A	Church Rd
Arm B	Greenfield Pl
Arm C	Knab Rd
Arm D	Annsbrae Pl

Flow Scaling Factor

Arm	Flow Scaling Factor (%)
Arm A	100
Arm B	100
Arm C	100
Arm D	100

File Properties

Run Title	Knab Masterplan - Roundabout Junction AM
Location	Lerwick, Shetlands
Date	07/09/2018
Client	7N / SIC
Enumerator	bfleming [GLA0911]
Job Number	106459
Status	Draft 1
Description	Church Rd / Greenfield Pl / Knab Rd / Annsbrae Pl Rbt

Errors and Warnings

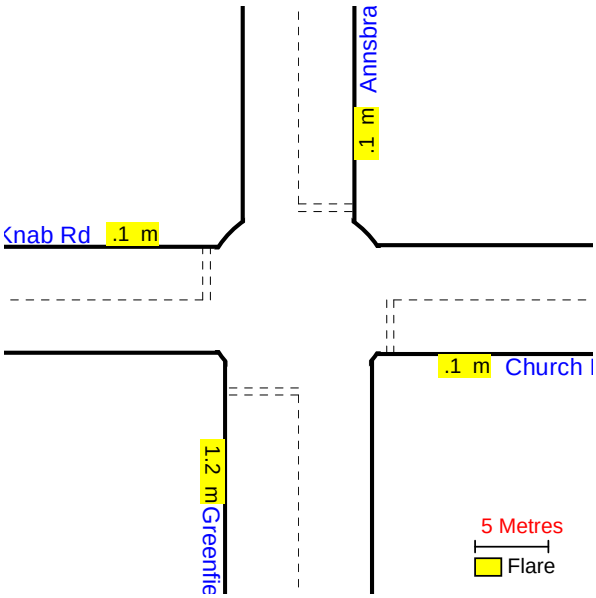
[No errors or warnings]

Mini-Roundabout Geometric Data

Data Item	Arm A	Arm B	Arm C	Arm D
Approach Road Half-Width (m)	4.10	2.70	3.90	4.00
Entry Width (m)	3.70	5.00	3.60	3.80
Flare Length (m)	0.10	1.20	0.10	0.10
Minimum Approach Half-Width (m)	3.00	2.70	3.90	4.00
Distance Between Arm and Next Arm (m)	9.30	5.00	10.30	10.00
Kerb Line Distance (m)	5.10	2.60	6.60	8.10
Gradient (%)	0.00	0.00	0.00	0.00
Kerbed Central Island	No	No	No	No
Slope	0.506	0.505	0.551	0.557
Intercept (PCU/Min)	12.950	12.849	14.623	15.115

Lighting Conditions: **Normal**
Road Surface Conditions: **Normal**

Junction Diagram: (View Extent = 40m)



Angles Between Arms (Degrees): Arm A(90) Arm B(90) Arm C(90) Arm D(90)

Demand Data

Demand Profiles are Synthesised using **ODTAB** Data
Period of interest (for Queue and Delay calculations): **08:15 to 09:45**
Length of Time Period: **90 min**
Length of Time Segment: **15 min**

Total Traffic Demand (Vehicles/Hour) for Demand Set: 2026 AM Base + Dev

From/To	Arm A	Arm B	Arm C	Arm D
Arm A	0.0	0.0	110.0	102.0
Arm B	1.0	0.0	3.0	9.0
Arm C	101.0	5.0	0.0	222.0
Arm D	202.0	9.0	266.0	0.0

Entry Flow Data for Demand Set: 2026 AM Base + Dev

Arms	Number of Minutes From Start When			Rate of flow (Veh/Min)		
	Flow Starts To Rise	Top of Peak is Reached	Flow Stops Falling	Before Peak	At Top of Peak	After Peak
Arm A	15.00	45.00	75.00	2.65	3.98	2.65
Arm B	15.00	45.00	75.00	0.16	0.24	0.16
Arm C	15.00	45.00	75.00	4.10	6.15	4.10
Arm D	15.00	45.00	75.00	5.96	8.94	5.96

Turning Proportions

ODTAB Demand Data type is used, no turning proportions available.

Heavy Vehicle Percentages for Demand Set: 2026 AM Base + Dev

Vehicle percentages constant over time and entry

Time Period	From/To	Arm A	Arm B	Arm C	Arm D
08:15 to 09:45	Arm A	0.0	0.0	110.0	102.0
	Arm B	1.0	0.0	3.0	9.0
	Arm C	101.0	5.0	0.0	222.0

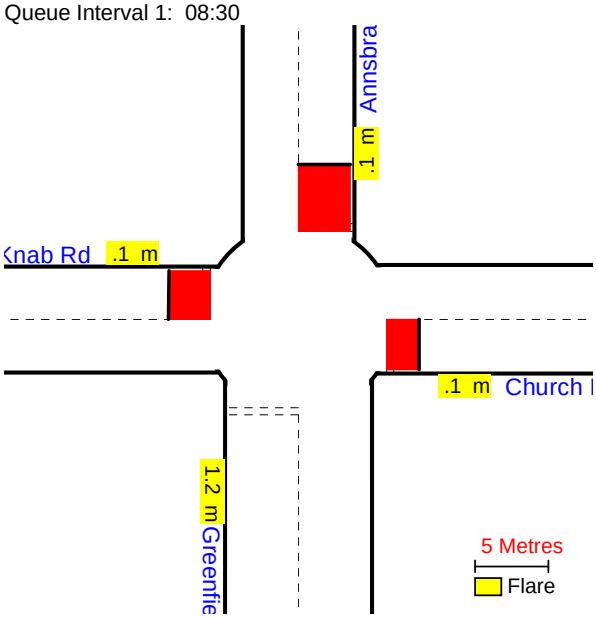
Time Period	From/To	Arm A	Arm B	Arm C	Arm D
	Arm D	202.0	9.0	266.0	0.0

Queue Diagrams: (View Extent = 40m)

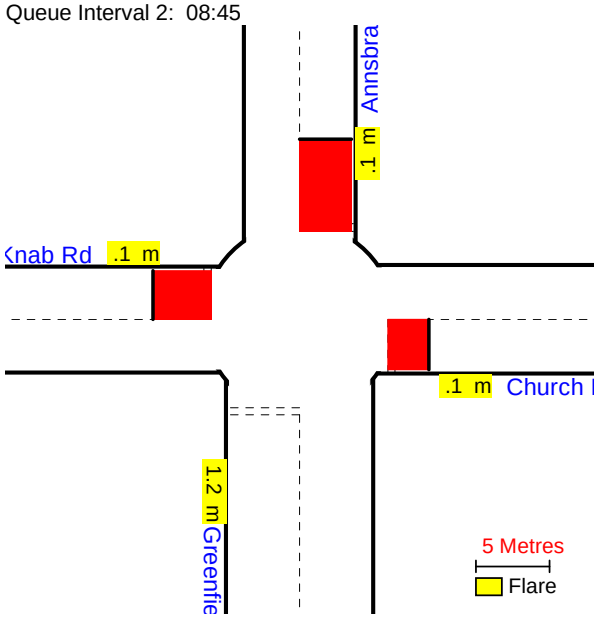
Queue Length	Colour
Mean Queue	
5 th % ile	
90 th % ile	
95 th % ile	

Start Time: 08:15---> End Time: 09:45

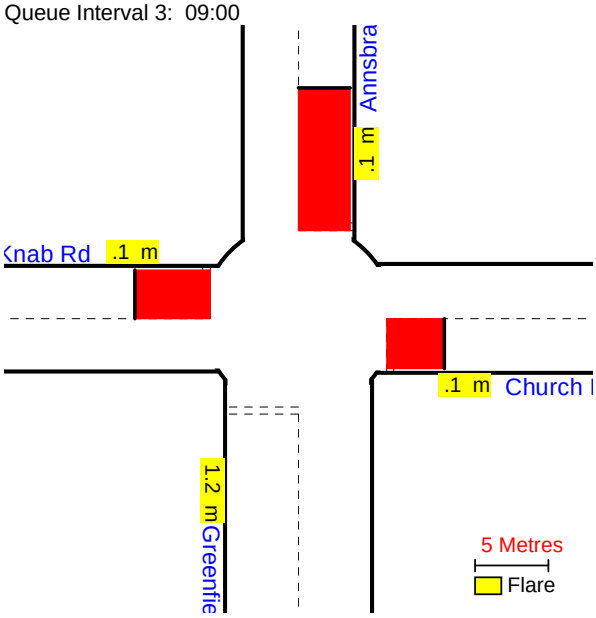
Queue Interval 1: 08:30



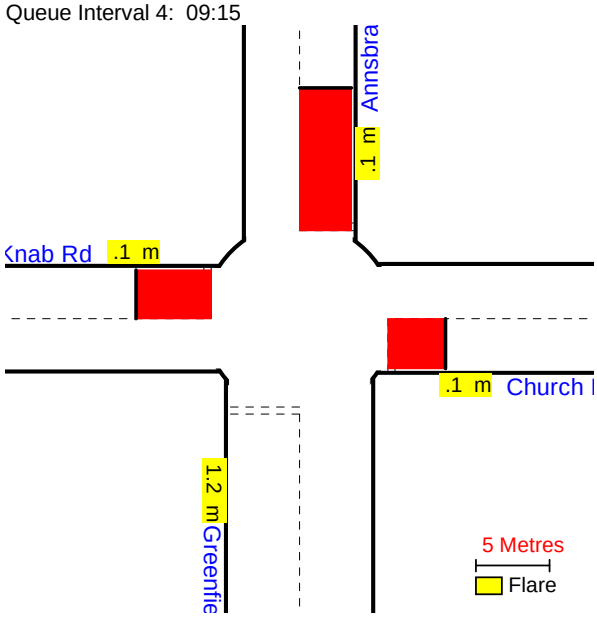
Queue Interval 2: 08:45



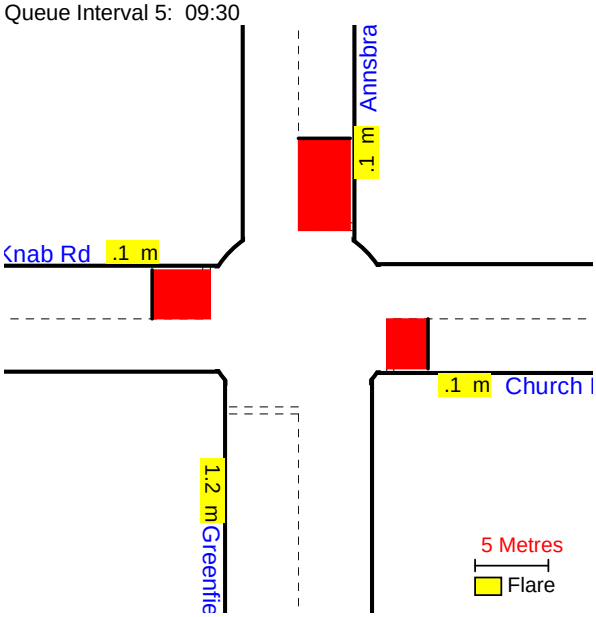
Queue Interval 3: 09:00



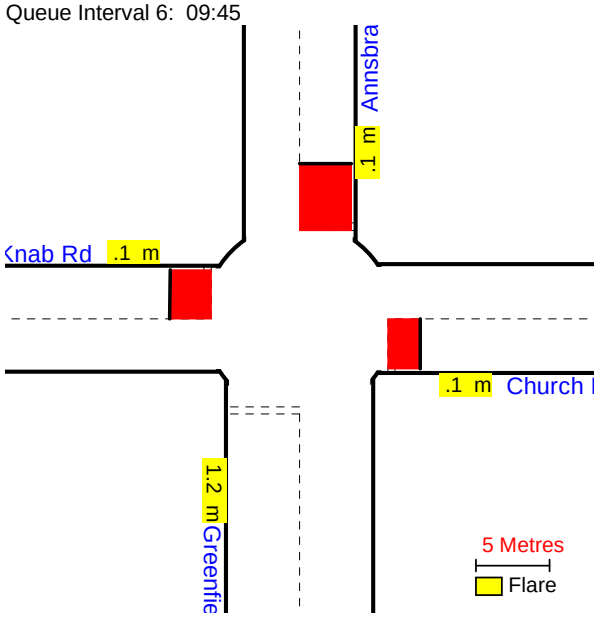
Queue Interval 4: 09:15



Queue Interval 5: 09:30



Queue Interval 6: 09:45

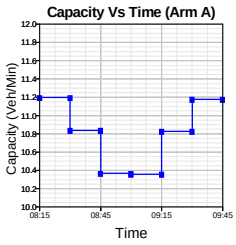


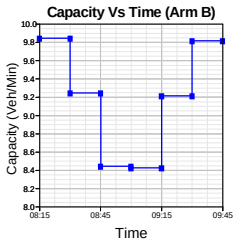
Demand Data Graphs

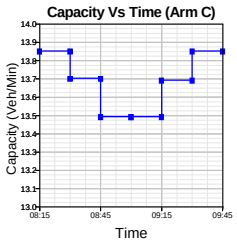
No graph available

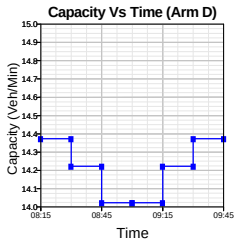
Capacity (against Time) Graphs, for each 15min Interval (08:15 - 09:45)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



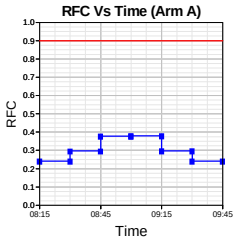


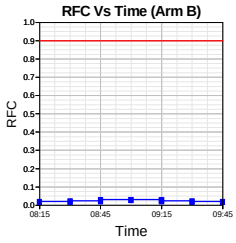


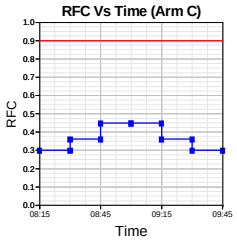


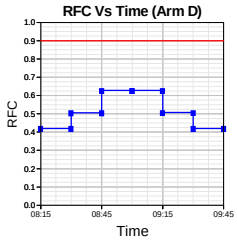
RFC (against Time) Graphs, for each 15min Interval (08:15 - 09:45)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



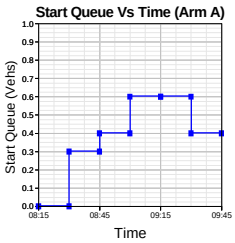


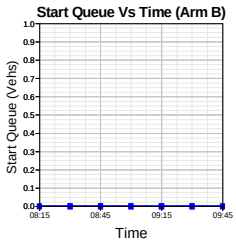


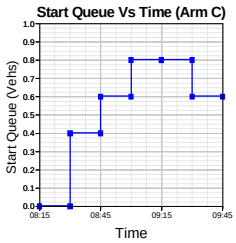


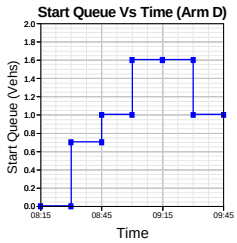
Start Queue (against Time) Graphs, for each 15min Interval (08:15 - 09:45)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



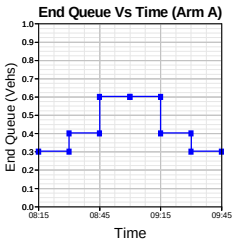


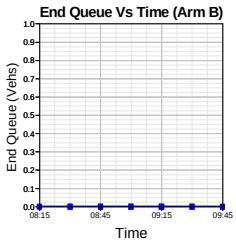


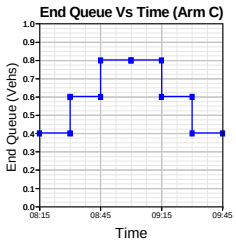


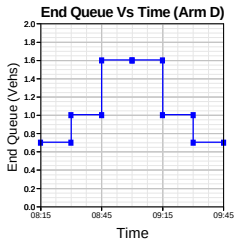
End Queue (against Time) Graphs, for each 15min Interval (08:15 - 09:45)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)







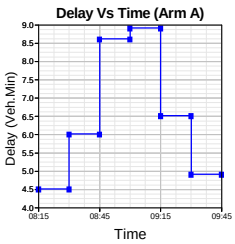


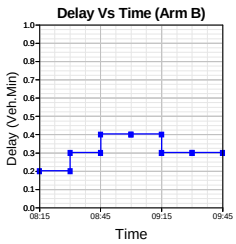
Geometric Delay Graph

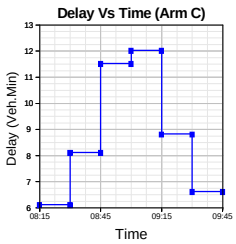
No Data. Please select 'Geometric Delay' in 'Principal Options' and try again.

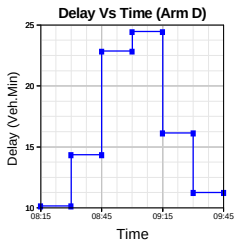
Delay (against Time) Graphs, for each 15min Interval (08:15 - 09:45)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)









Queues and Delay:

Segment	Arm	Demand (Veh / Min)	Capacity (Veh / Min)	Demand / Capacity (RFC)	Ped Flow (Ped / Min)	Start Queue (Veh)	End Queue (Veh)	Delay (Veh.Min / Time Segment)	Geometric Delay (Veh.Min / Time Segment)	Arrival Delay (Min / Veh)
Segment : 1 - 08:15 to 08:30	A	2.66	11.19	0.238	-	0.0	0.3	4.5	-	0.117
	B	0.16	9.84	0.017	-	0.0	0.0	0.2	-	0.103
	C	4.12	13.85	0.297	-	0.0	0.4	6.1	-	0.102
	D	5.99	14.37	0.416	-	0.0	0.7	10.1	-	0.118
Segment : 2 - 08:30 to 08:45	A	3.18	10.83	0.293	-	0.3	0.4	6.0	-	0.130
	B	0.19	9.24	0.021	-	0.0	0.0	0.3	-	0.111
	C	4.91	13.70	0.359	-	0.4	0.6	8.1	-	0.114
	D	7.15	14.22	0.502	-	0.7	1.0	14.3	-	0.140
Segment : 3 - 08:45 to 09:00	A	3.89	10.36	0.375	-	0.4	0.6	8.6	-	0.154
	B	0.24	8.44	0.028	-	0.0	0.0	0.4	-	0.122
	C	6.02	13.49	0.446	-	0.6	0.8	11.5	-	0.133
	D	8.75	14.02	0.624	-	1.0	1.6	22.8	-	0.187
Segment : 4 - 09:00 to 09:15	A	3.89	10.35	0.376	-	0.6	0.6	8.9	-	0.155
	B	0.24	8.42	0.028	-	0.0	0.0	0.4	-	0.122
	C	6.02	13.49	0.446	-	0.8	0.8	12.0	-	0.134
	D	8.75	14.02	0.624	-	1.6	1.6	24.4	-	0.189
Segment : 5 - 09:15 to 09:30	A	3.18	10.82	0.294	-	0.6	0.4	6.5	-	0.131
	B	0.19	9.21	0.021	-	0.0	0.0	0.3	-	0.111
	C	4.91	13.69	0.359	-	0.8	0.6	8.8	-	0.114
	D	7.15	14.22	0.503	-	1.6	1.0	16.1	-	0.143
Segment : 6 - 09:30 to 09:45	A	2.66	11.17	0.238	-	0.4	0.3	4.9	-	0.118
	B	0.16	9.81	0.017	-	0.0	0.0	0.3	-	0.104
	C	4.12	13.85	0.297	-	0.6	0.4	6.6	-	0.103
	D	5.99	14.37	0.417	-	1.0	0.7	11.2	-	0.120

Queuing Delay Information Over Whole Period

Arm	Total Demand		Queueing Delay		Inclusive Queueing Delay	
	(Veh)	(Veh/Hr)	(Min)	(Min/Veh)	(Min)	(Min/Veh)
A	291.8	194.5	39.3	0.13	39.3	0.13
B	17.9	11.9	2.0	0.11	2.0	0.11
C	451.5	301.0	52.9	0.12	52.9	0.12
D	656.6	437.7	99.0	0.15	99.0	0.15
ALL	1417.7	945.1	193.2	0.14	193.2	0.14

Delay is that occuring only within the time period.
Inclusive delay includes delay suffered by vehicles that are still queueing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

Accident Data

No Data, please select either the 'Simple Accident Analysis' or 'Full Accident Analysis' option in 'Principal Options' and try again.

Accident Results

No Data, please select either the 'Simple Accident Analysis' or 'Full Accident Analysis' option in 'Principal Options' and try again.

Run Information

Run with file:- **u:\SCT\2017\T&T\106459 - Knab Masterplan\CALCULATIONS\TRAFFIC\ARCADY\Knab Masterplan - Roundabout Junction PM.vai**
At: **10:11:17 on Friday, February 15, 2019**
Mode: **Drive On The Left**
Units: **Metric**

Arm Labelling

Arm	Full Arm Names
Arm A	Church Rd
Arm B	Greenfield Pl
Arm C	Knab Rd
Arm D	Annsbrae Pl

Flow Scaling Factor

Arm	Flow Scaling Factor (%)
Arm A	100
Arm B	100
Arm C	100
Arm D	100

File Properties

Run Title	Knab Masterplan - Roundabout Junction PM
Location	Lerwick, Shetlands
Date	07/09/2018
Client	7N / SIC
Enumerator	bfleming [GLA0911]
Job Number	106459
Status	Draft 1
Description	Church Rd / Greenfield Pl / Knab Rd / Annsbrae Pl Rbt

Errors and Warnings

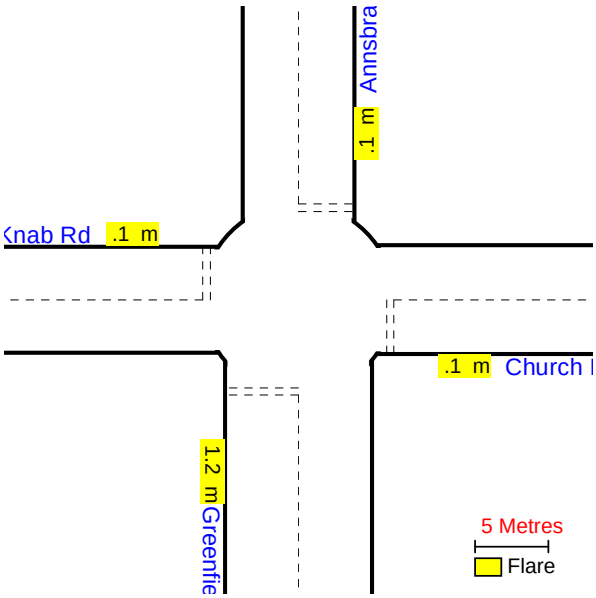
[No errors or warnings]

Mini-Roundabout Geometric Data

Data Item	Arm A	Arm B	Arm C	Arm D
Approach Road Half-Width (m)	4.10	2.70	3.90	4.00
Entry Width (m)	3.70	5.00	3.60	3.80
Flare Length (m)	0.10	1.20	0.10	0.10
Minimum Approach Half-Width (m)	3.00	2.70	3.90	4.00
Distance Between Arm and Next Arm (m)	9.30	5.00	10.30	10.00
Kerb Line Distance (m)	5.10	2.60	6.60	8.10
Gradient (%)	0.00	0.00	0.00	0.00
Kerbed Central Island	No	No	No	No
Slope	0.506	0.505	0.551	0.557
Intercept (PCU/Min)	12.950	12.849	14.623	15.115

Lighting Conditions: **Normal**
Road Surface Conditions: **Normal**

Junction Diagram: (View Extent = 40m)



Angles Between Arms (Degrees): Arm A(90) Arm B(90) Arm C(90) Arm D(90)

Demand Data

Demand Profiles are Synthesised using **ODTAB** Data
Period of interest (for Queue and Delay calculations): **14:45 to 16:15**
Length of Time Period: **90 min**
Length of Time Segment: **15 min**

Total Traffic Demand (Vehicles/Hour) for Demand Set: 2026 PM Base + Dev

From/To	Arm A	Arm B	Arm C	Arm D
Arm A	0.0	1.0	126.0	54.0
Arm B	1.0	0.0	10.0	6.0
Arm C	69.0	11.0	0.0	242.0
Arm D	75.0	13.0	358.0	0.0

Entry Flow Data for Demand Set: 2026 PM Base + Dev

Arms	Number of Minutes From Start When			Rate of flow (Veh/Min)		
	Flow Starts To Rise	Top of Peak is Reached	Flow Stops Falling	Before Peak	At Top of Peak	After Peak
Arm A	15.00	45.00	75.00	2.26	3.39	2.26
Arm B	15.00	45.00	75.00	0.21	0.32	0.21
Arm C	15.00	45.00	75.00	4.03	6.04	4.03
Arm D	15.00	45.00	75.00	5.57	8.36	5.57

Turning Proportions

ODTAB Demand Data type is used, no turning proportions available.

Heavy Vehicle Percentages for Demand Set: 2026 PM Base + Dev

Vehicle percentages constant over time and entry

Time Period	From/To	Arm A	Arm B	Arm C	Arm D
14:45 to 16:15	Arm A	0.0	1.0	126.0	54.0
	Arm B	1.0	0.0	10.0	6.0
	Arm C	69.0	11.0	0.0	242.0

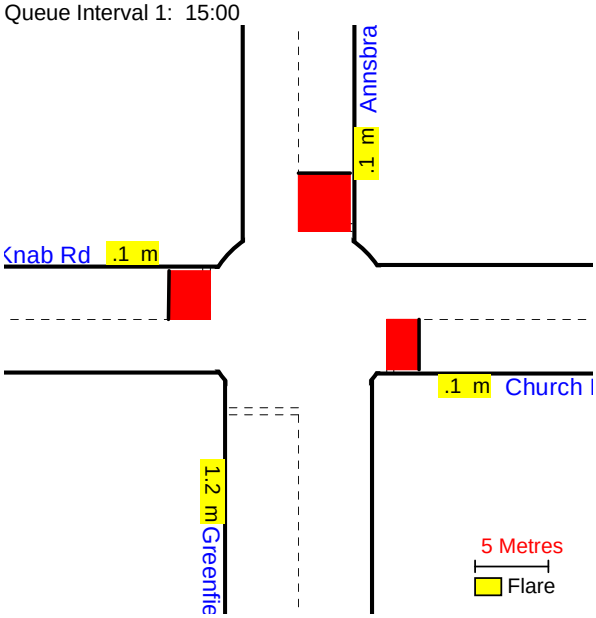
Time Period	From/To	Arm A	Arm B	Arm C	Arm D
	Arm D	75.0	13.0	358.0	0.0

Queue Diagrams: (View Extent = 40m)

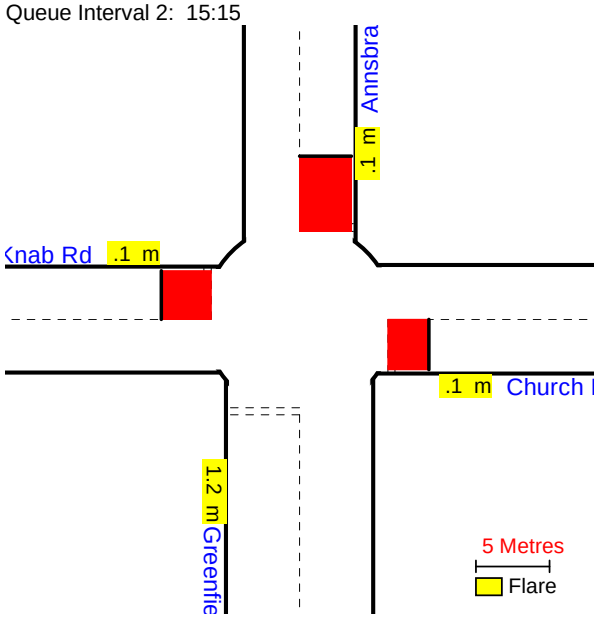
Queue Length	Colour
Mean Queue	
5 th % ile	
90 th % ile	
95 th % ile	

Start Time: 14:45---> End Time: 16:15

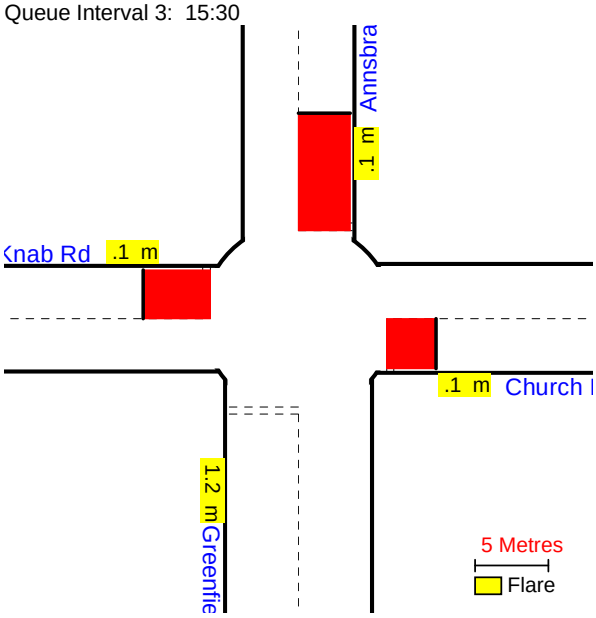
Queue Interval 1: 15:00



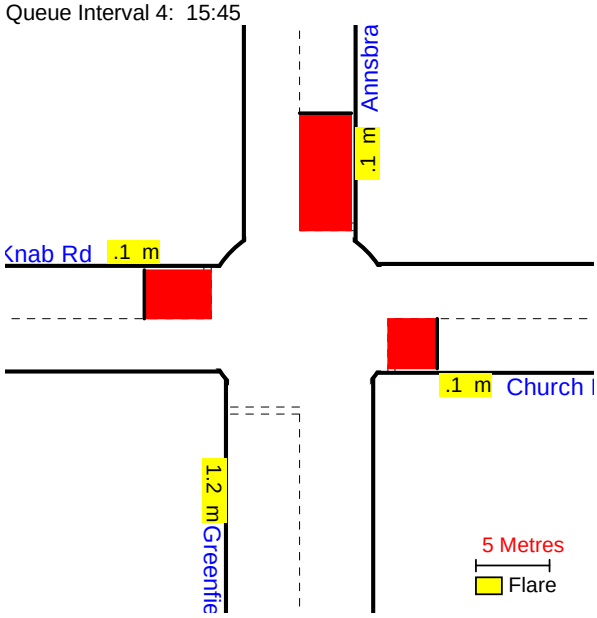
Queue Interval 2: 15:15



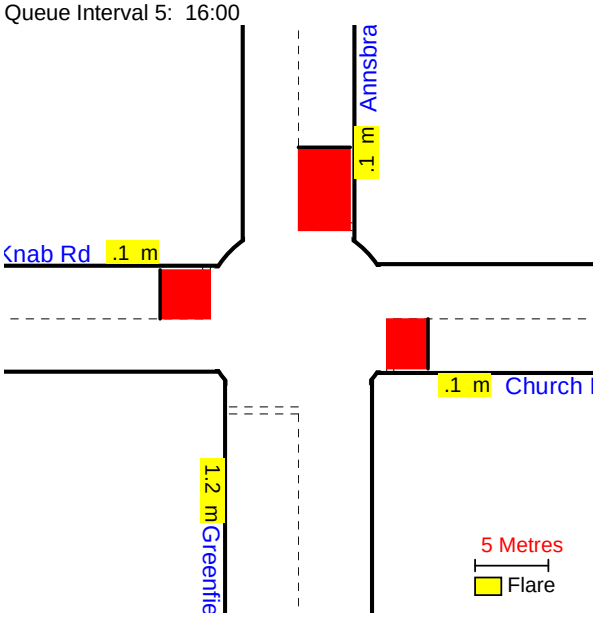
Queue Interval 3: 15:30



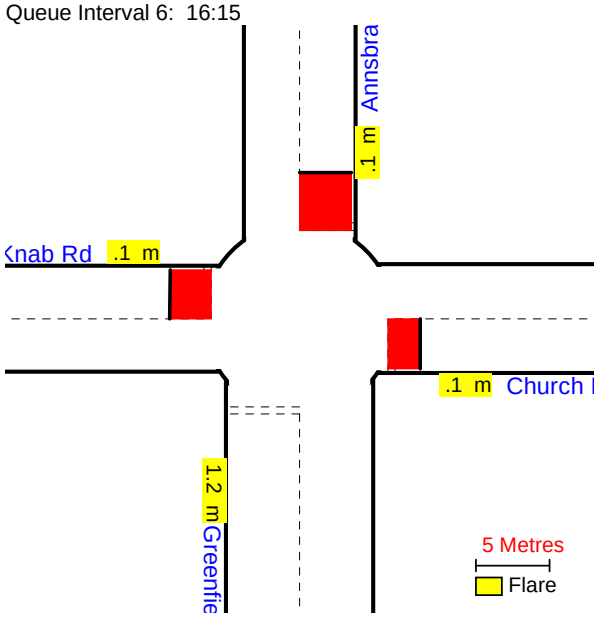
Queue Interval 4: 15:45



Queue Interval 5: 16:00



Queue Interval 6: 16:15

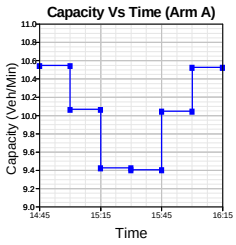


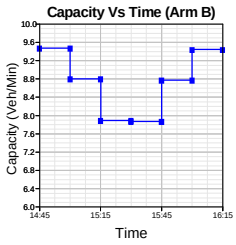
Demand Data Graphs

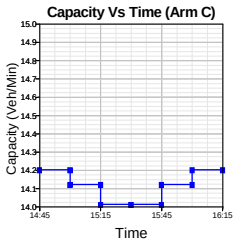
No graph available

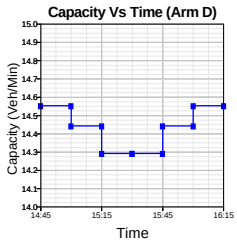
Capacity (against Time) Graphs, for each 15min Interval (14:45 - 16:15)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



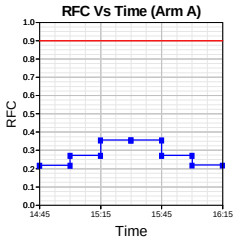


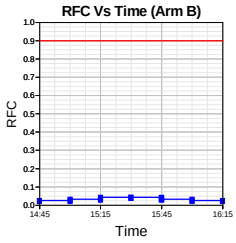


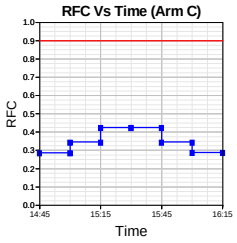


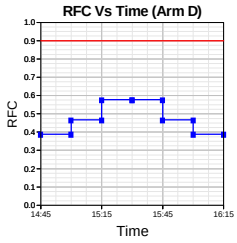
RFC (against Time) Graphs, for each 15min Interval (14:45 - 16:15)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



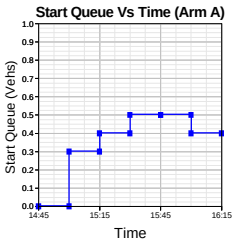


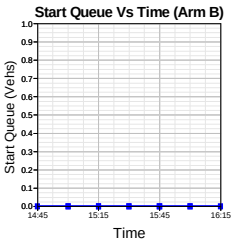


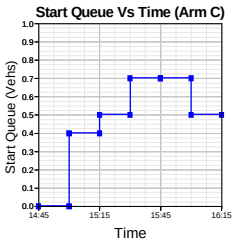


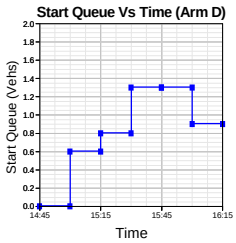
Start Queue (against Time) Graphs, for each 15min Interval (14:45 - 16:15)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)



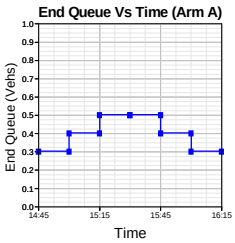


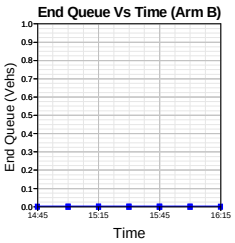


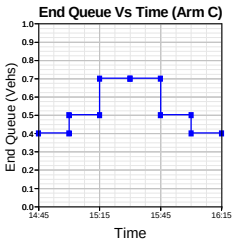


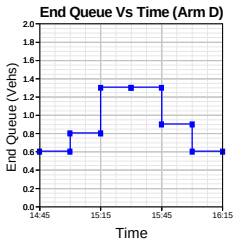
End Queue (against Time) Graphs, for each 15min Interval (14:45 - 16:15)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)







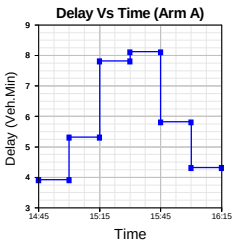


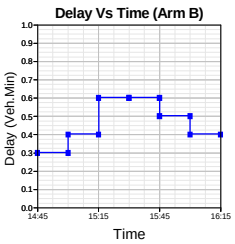
Geometric Delay Graph

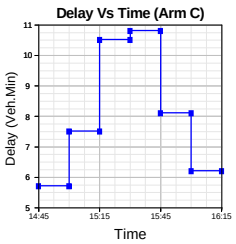
No Data. Please select 'Geometric Delay' in 'Principal Options' and try again.

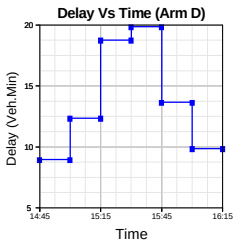
Delay (against Time) Graphs, for each 15min Interval (14:45 - 16:15)

(QUEUEING DELAY INFORMATION OVER WHOLE PERIOD)









Queues and Delay:

Segment	Arm	Demand (Veh / Min)	Capacity (Veh / Min)	Demand / Capacity (RFC)	Ped Flow (Ped / Min)	Start Queue (Veh)	End Queue (Veh)	Delay (Veh.Min / Time Segment)	Geometric Delay (Veh.Min / Time Segment)	Arrival Delay (Min / Veh)
Segment : 1 - 14:45 to 15:00	A	2.27	10.54	0.215	-	0.0	0.3	3.9	-	0.120
	B	0.21	9.46	0.023	-	0.0	0.0	0.3	-	0.108
	C	4.04	14.20	0.284	-	0.0	0.4	5.7	-	0.098
	D	5.60	14.55	0.385	-	0.0	0.6	8.9	-	0.111
Segment : 2 - 15:00 to 15:15	A	2.71	10.06	0.270	-	0.3	0.4	5.3	-	0.136
	B	0.25	8.79	0.029	-	0.0	0.0	0.4	-	0.117
	C	4.82	14.12	0.342	-	0.4	0.5	7.5	-	0.107
	D	6.68	14.44	0.463	-	0.6	0.8	12.3	-	0.128
Segment : 3 - 15:15 to 15:30	A	3.32	9.42	0.353	-	0.4	0.5	7.8	-	0.164
	B	0.31	7.88	0.040	-	0.0	0.0	0.6	-	0.132
	C	5.91	14.01	0.422	-	0.5	0.7	10.5	-	0.123
	D	8.18	14.29	0.573	-	0.8	1.3	18.7	-	0.162
Segment : 4 - 15:30 to 15:45	A	3.32	9.40	0.353	-	0.5	0.5	8.1	-	0.164
	B	0.31	7.86	0.040	-	0.0	0.0	0.6	-	0.132
	C	5.91	14.01	0.422	-	0.7	0.7	10.8	-	0.123
	D	8.18	14.29	0.573	-	1.3	1.3	19.8	-	0.164
Segment : 5 - 15:45 to 16:00	A	2.71	10.04	0.270	-	0.5	0.4	5.8	-	0.137
	B	0.25	8.76	0.029	-	0.0	0.0	0.5	-	0.118
	C	4.82	14.12	0.342	-	0.7	0.5	8.1	-	0.108
	D	6.68	14.44	0.463	-	1.3	0.9	13.6	-	0.130
Segment : 6 - 16:00 to 16:15	A	2.27	10.52	0.216	-	0.4	0.3	4.3	-	0.121
	B	0.21	9.43	0.023	-	0.0	0.0	0.4	-	0.109
	C	4.04	14.20	0.285	-	0.5	0.4	6.2	-	0.099
	D	5.60	14.55	0.385	-	0.9	0.6	9.8	-	0.112

Queuing Delay Information Over Whole Period

Arm	Total Demand		Queueing Delay		Inclusive Queueing Delay	
	(Veh)	(Veh/Hr)	(Min)	(Min/Veh)	(Min)	(Min/Veh)
A	249.1	166.1	35.2	0.14	35.2	0.14
B	23.4	15.6	2.8	0.12	2.8	0.12
C	443.2	295.5	48.8	0.11	48.8	0.11
D	613.9	409.3	83.1	0.14	83.1	0.14
ALL	1329.6	886.4	169.9	0.13	169.9	0.13

Delay is that occuring only within the time period.
Inclusive delay includes delay suffered by vehicles that are still queueing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

Accident Data

No Data, please select either the 'Simple Accident Analysis' or 'Full Accident Analysis' option in 'Principal Options' and try again.

Accident Results

No Data, please select either the 'Simple Accident Analysis' or 'Full Accident Analysis' option in 'Principal Options' and try again.

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